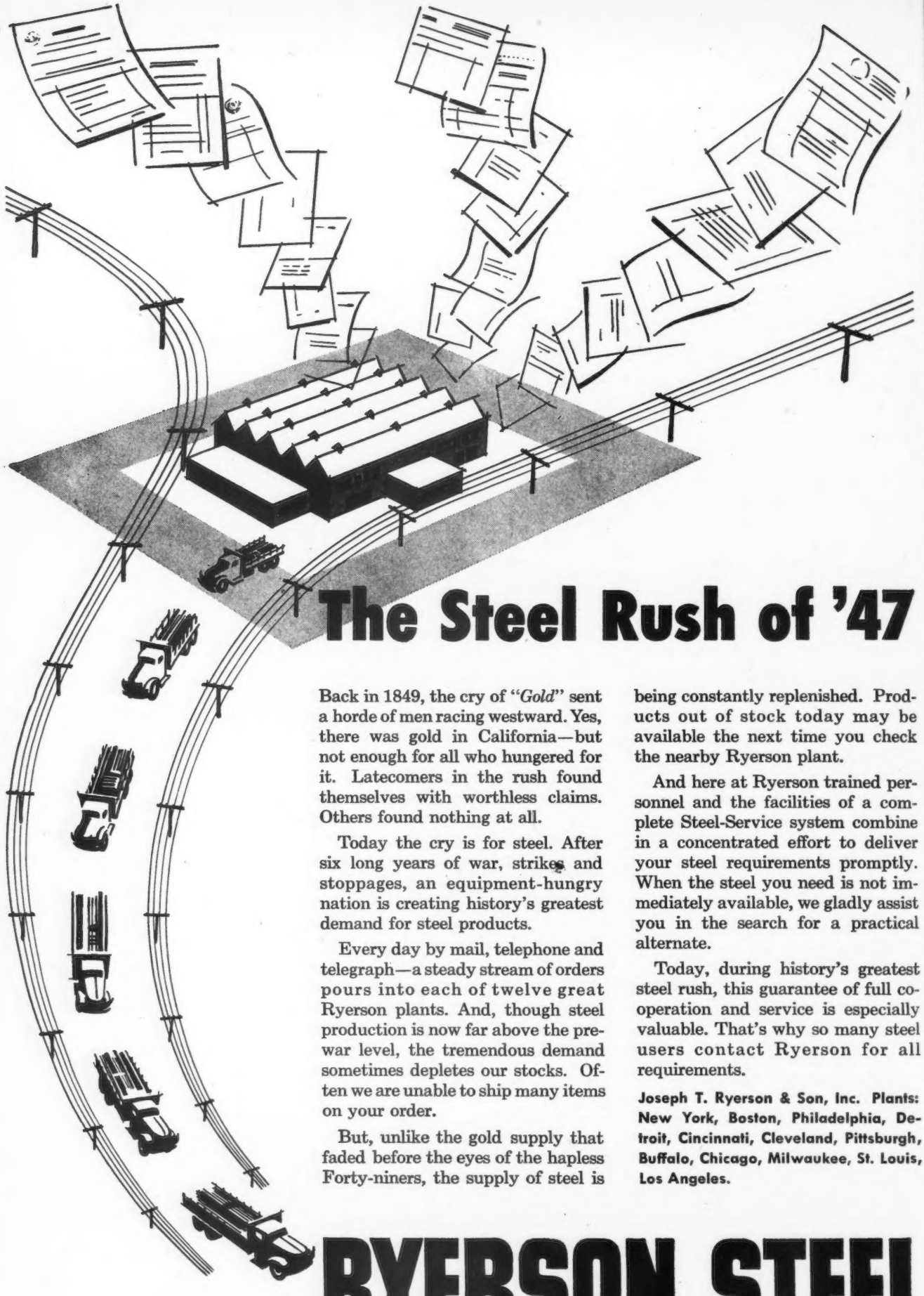
The IRON AGE

Vol. 159, No. 26 June 26, 1947



The Steel Rush of '47

Back in 1849, the cry of "*Gold*" sent a horde of men racing westward. Yes, there was gold in California—but not enough for all who hungered for it. Latecomers in the rush found themselves with worthless claims. Others found nothing at all.

Today the cry is for steel. After six long years of war, strikes and stoppages, an equipment-hungry nation is creating history's greatest demand for steel products.

Every day by mail, telephone and telegraph—a steady stream of orders pours into each of twelve great Ryerson plants. And, though steel production is now far above the pre-war level, the tremendous demand sometimes depletes our stocks. Often we are unable to ship many items on your order.

But, unlike the gold supply that faded before the eyes of the hapless Forty-niners, the supply of steel is being constantly replenished. Products out of stock today may be available the next time you check the nearby Ryerson plant.

And here at Ryerson trained personnel and the facilities of a complete Steel-Service system combine in a concentrated effort to deliver your steel requirements promptly. When the steel you need is not immediately available, we gladly assist you in the search for a practical alternate.

Today, during history's greatest steel rush, this guarantee of full co-operation and service is especially valuable. That's why so many steel users contact Ryerson for all requirements.

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

RYERSON STEEL

ESTABLISHED 1855

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June 26, 1947

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What Price Peace?

MUST it be "inevitable" that the world dance its last macabre tune with atom bomb, radioactive dust and electronic missile? Possibly so, what with the disturbing tendency—the almost benumbed acceptance as fact in these United States—that the fragile line through Europe from Nordkapp to Cape Bon must necessarily fracture.

Hardly a person is there so dull of mind as not to recognize the price of modern war, with its fantastic destruction of life, wealth and morality. But the cost of peace—or some reasonable facsimile in terms of balance of power—is a far more elusive and subtle affair of mind and spirit. If war comes next year, or in 1960, the very resort to the sword will be an admission that the mind and spirit have wavered—that each person in his own way must certainly pay the price of war through unwillingness to pay the cost of peace.

And what will be this cost of peace? So far it has been a slowly rising crescendo of important voices urging a vast infusion of dollars into Western Europe to thwart starvation, to rebuild economic and industrial life, to lend strength to the faltering heartbeats of representative government. President Truman, Mr. Marshall, Mr. Hoover, Mr. Acheson, Mr. Stassen (but, as yet, not Mr. Vandenberg), Mr. Fullbright and many others are painting in bold strokes the State Department's breath-taking picture of underwriting Europe. But there is understandable hesitancy to fill in the entire picture, a cautious reluctance to detail the means by which the end is to be achieved.

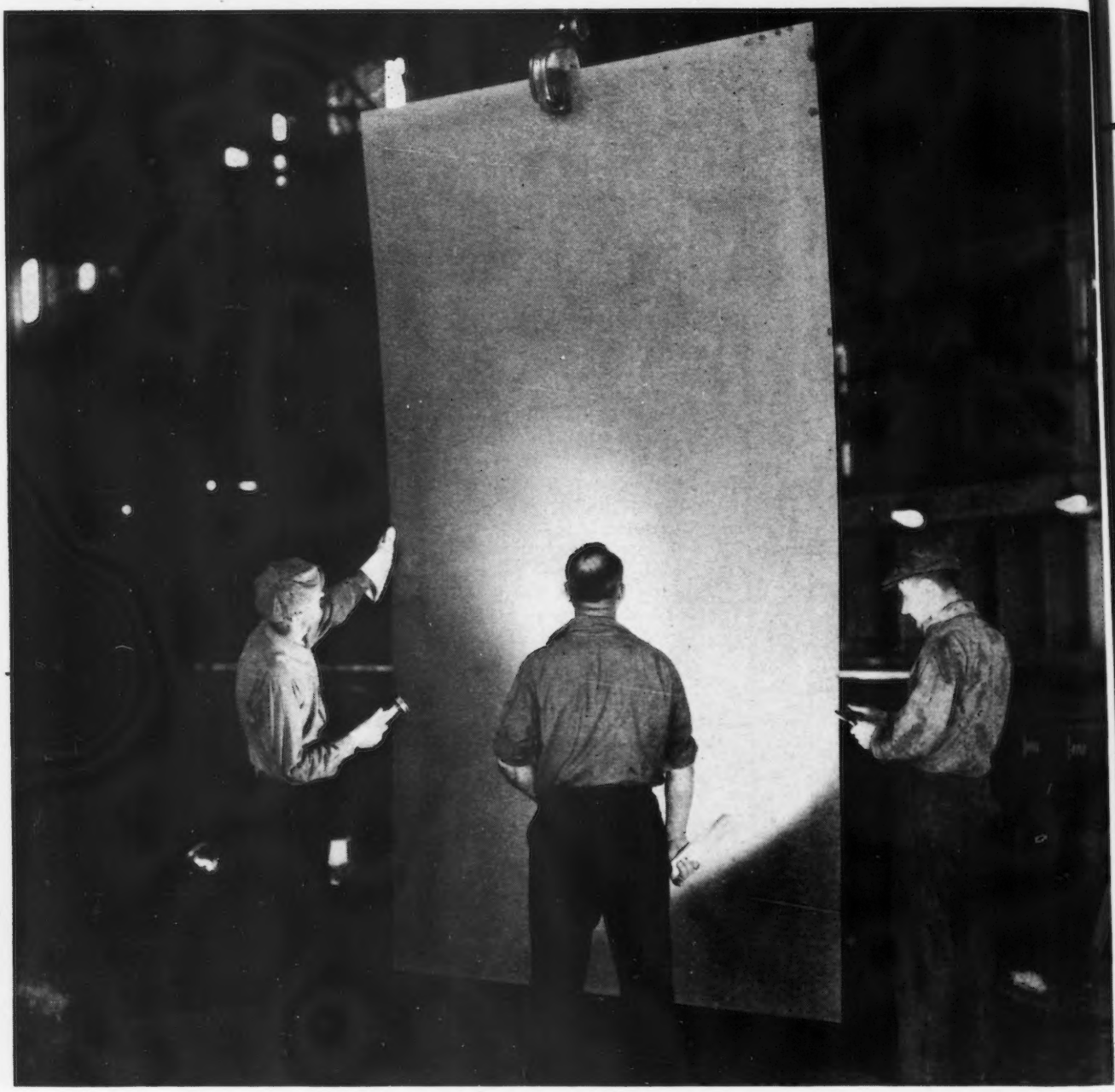
No one yet has had courage enough to explore the unpleasant necessity of translating tremendous dollar credits into continued high taxes and thus lower American living standards; that the dollars represent large quantities of steel, wheat and coal urgently needed to stave off economic collapse in Western Europe; that there may well have to be a distasteful return of government intervention and bureaucratic regulation of certain productive, consumptive and export-import activities.

So far, this positive and bold plan to face-up to the Kremlin with something more than pious recriminations and breast-thumping heroics has been snowballed along by a chorus of friendly voices. But what of the unfriendly voices that will race across the headlines this fall and winter? How palatable to the public will be this further delay in the automobiles, the washing machines, the flood of consumer goods so impatiently awaited since war's end? And what of Congress? Will Congress gulp such a bitter brew when it has repeatedly gagged at gnats—gnats such as extension of Presidential import and export controls so essential to effective translation of Europe's small hoard of dollars into the machinery and raw materials so desperately needed; or understanding and sympathetic support of Mr. Clayton in his tariff negotiations at Geneva; or willingness to implement the need for universal military training.

Just how steady will be the nerves and resolution of the country when Mr. Marshall in November again faces Mr. Molotov at the Foreign Ministers' conference table? Behind Mr. Molotov will be the USSR ringed by an ideologically and economically integrated buffer zone of satellite states, with only Finland and Czechoslovakia yet to be molded to shape. It would be unfortunate that if behind Mr. Marshall there should be a country engaged in a wrestling match with itself, so absorbed in the internecine warfare of a Presidential election as to have a political hammerlock on its own neck, only to squirm a bit and finally stagger out to find once again that it has been a matter of "too little, too late."

This ideological and economic struggle won't be a soap-opera, Superman affair with a Cinderella ending. It's a matter of years of hard work, of giving, of sacrificing and unselfish labor abroad, of sweat and tears and disappointments.

T. W. Lippert



Inland Sheets Must Meet Rigid Standards

The Inland inspectors shown here are examining a sample sheet sheared from a coil of hot rolled steel . . . looking for surface defects. Their experienced eyes, scrutinizing sample sheets taken at frequent intervals, quickly detect the first signs of wear on the rolls. Frequent roll changes, based on the findings of such inspectors, help make possible the uniformity and freedom from surface defects that characterize Inland sheets.

PRINCIPAL PRODUCTS: STRUCTURALS • BARS • PLATES • SHEETS • STRIP • TIN PLATE • PILING • RAILS • TRACK ACCESSORIES

INLAND STEEL COMPANY

38 South Dearborn Street, Chicago 3, Illinois

Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

INLAND STEEL

► Steel mills face possible demands for refunds to the Government on wartime shipments accepted by shipyards on a "guess-weight" basis because of the 3½ pct tolerance allowance. The Maritime Commission finance division has under way an undercover investigation, checking shipments received against carrier's records. Investigators believe millions in overpayments may be due the Treasury. The Navy is said to be considering a similar check.

► Automobile manufacturers now concerned with sales of "used" cars at well over list prices may take a tip from British automakers. There the dealers' trade association, with the cooperation of the manufacturers, requires the purchaser to sign an agreement forbidding resale without the dealer's permission within a 1-year period. The plan has eliminated about 90 pct of the super priced resales.

► Aluminum-soled shoes may soon make their appearance in this country. Their Hungarian inventor is contemplating a sales campaign here. Russia is reported interested to the extent of a trial order for 6 million pairs. Now under production, the bottom part is of aluminum to which either leather or textile uppers may be attached.

► A Hydropress engineer predicts that, depending upon progress with die materials, it may not be long before structural profiles can be extruded in stainless steel.

► Best guess now is that no major auto manufacturer will bring out new models until early 1948 though at least one independent is expected to introduce a new car this year. Possibilities of a coal tieup affecting steel supply, high tooling costs and the continued high demand for present models are among the reasons.

► Despite formidable production difficulties in making sensitive type 100-octane fuels required for the new high compression engines, the solution to the fuel problem is believed to be closer at hand than actual production of the fuel-saving engines.

► Wright Aeronautical Corp., following 3 years of experimentation for the Army, is testing one of the largest turbine-type engines known to be under development. Its power is expected to approach that of four 2500-hp piston type engines. GM's Allison Div. is reported to have a unit under way which will develop 7500 hp at 600 mph.

► Two companies have developed sheet and strip thickness indicators based on the X-ray principle. These instruments, which perform much in the manner of "flying micrometers" at the runout end of cold reducing mills, are in use in several mills. Though not completely perfected, experiments to date are promising.

► Looking years ahead, major oil producers are not worrying about a possible exhaustion of existing petroleum sources. Auto engineers were recently assured that synthetic fuels will be available at reasonable cost when or if our present supply peters out.

► Current Senate investigation of the steel shortage and gray market will have a more far-reaching effect than appears on the surface. Other government agencies are quietly taking notes from the sidelines. For instance, Treasury agents are taking names; presumably, many income tax returns will be scanned more closely.

► The top ceiling on steel production in Western Germany set by the Allied Control Council will probably be quietly scrapped by the occupation authorities in the Anglo-American zone. Instead of a 7.5 million-ton limit, it is expected that a 12 million-ton industry will be accepted.

Germans are now plugging for a 14-million ton setup. Planning on the size of the French steel industry will have to be sharply revised if Germany goes above the 7.5 million-ton limit.

► Automatic transmissions are definitely in sight for cars in all price classes. Only a few production problems remain, and announcements may be expected soon provided the competitive sales outlook and materials availability situation look sufficiently promising.

. . . Production Control at Ca

By W. G. THANNERT
Superintendent, Timestudy and Layout Sections,
Caterpillar Tractor Co.,
Peoria, Ill.

THERE has been considerable interest in recent years in production control and wide and varied are the opinions of what constitutes good production control. One thing is certain, however, and that is that effective production controls are necessary in the conduct of a successful manufacturing operation. A good production control is one in which is found constant study being made to improve its operation through the application of modern business methods and in which there is no tendency to adopt a stereotyped system. Any system of production control must be made to fit the particular industry for which it is intended.

Production control should operate as a service to manufacturing, preparing the way and supplying the necessary production information and aids, as well as tools, materials, and schedules, directing and checking on the progress of the work and closing the records upon the accomplishment of the job or filling of the manufacturing work orders. It has sometimes been called the paper work of manufacturing, although this term is too limited to cover all of its duties.

Various functions may come under production control and may be known in different industries by other designations, and while there are many services that may be tied in with production control, for the purpose of this article, the discussion is limited to the two fundamental responsibilities of production control, that is, material control and scheduling.

Requisitioning and control of material must be based on the need for that material in manufacturing the product to be sold. These controls at Caterpillar Tractor Co. are governed by a prime product schedule prepared by administrative officers, who, in preparing such schedule, have kept in mind the demand for the product, the length of time required to obtain and manufacture material, and the capacity of the plant.

Schedules for the manufacture of special attachments are furnished to the materials division by the merchandise department, which maintains sufficient records to permit basing these authorizations upon past sales history and sales department recommendations. Authorizations for the manufacture of parts are furnished by the parts department and are based upon past history and service department recommendations.

Individual part records are set up in the materials division showing all information as furnished by the planning department. This includes part number, description, engineering change number, model designation of the prime product on which the part is to be used and the quantity per model, process time, whether to be manufactured or purchased, and, if to be manufactured, the kind and amount of material to buy for each part.

The special attachment section maintains records on groups or arrangements which are authorized for manufacture and sale as attachments. It is the duty of this section to furnish the tabulating section with up-to-date information from which it can maintain master decks of cards for each group, and detail decks for each schedule as authorized by the merchandise department.

The parts section maintains files of the parts department authorizations and processes any revisions to them before passing them on to the tabulating or stock records section.

Charts for each stock control clerk are prepared in condensed form from the administrative prime product schedule. Stock control clerks post on each record the requirements for parts and special attachments.

From the chart and all information on the record, stock control clerks calculate the material required for each month covered by the prime product schedule. These computations include a machining scrap allowance based on past history. This is reviewed as often as necessary as improved methods of manufacture are disclosed by diminishing scrap losses. Requisitions are prepared and sent to the purchasing department showing the requirements for each month, the process time, and the amount of material to be purchased.

Monthly work orders are issued to the shop on most parts, although small usage parts are manufactured in larger than monthly quantities as recommended by the scheduling division. Such recommendations are based upon a definite need for such quantities for sale and upon relative costs and machining time of small quantities as compared to larger quantities.

Work orders are prepared by the duplicating sec-

Caterpillar . . .

Effective production control methods are vital to the successful management of any metalworking plant. This article, which describes in detail the successful methods used at the Caterpillar Tractor Co., contains many practical ideas for executives interested in establishing efficient production control techniques. The article places particular emphasis on methods of material control and production scheduling.

tion and given to the scheduling division for distribution to all stores and shops involved in the handling or machining of the parts.

These work orders show, in addition to the descriptions of machines and operations, the quantity to be machined, the month in which the finished material is to be used, and the delivery location of the finished pieces.

As material is received from outside sources, it is unloaded and checked against packing lists which are sent to the receiving records section of the materials division for the preparation of receiving reports. Copies of the receiving reports are sent to the stock records unit for posting, to receiving inspection for approval, and to stores. These receiving reports designate the stores to which the material is moved after approval by the inspection department.

In order to speed up issuance of receiving reports and the inspection of material received, teletype sending and receiving sets have been installed in the reciving records section and in the inspection departments respectively. This enables the inspection to be started immediately after a receiving report is typed.

All purchased materials are stored and cared for by the materials division. This storage is planned on three basic principles: (1) Preservations of the material until required in manufacturing or assembly operations; (2) economy, and (3) safety of the workers.

Preservation of material requires proper identification and careful handling. Stock records are maintained by stores showing the exact location of all materials. Bins and storage bays are specifically marked as to location and material stored therein. Metallurgical specifications of raw steel are identified by paint codes.

Special containers and other storage facilities are constantly being improved in order to reduce losses caused by less careful storage. For example, special racks are used for stacking large gaskets which would otherwise be damaged in handling. Proper storage not only protects the investment in materials, but insures continued production of products for which such material was purchased.

Caterpillar storekeepers are constantly doing research work on economical storage. This necessitates the cooperation of purchasing department and material vendors. Standard unit loadings by suppliers are resulting in savings for them as well as Caterpillar. The most promising of these loadings and handling improvements is palletizing. Palletizing of materials makes use of power lift trucks and enables the plant to handle material in a fraction of the time and at a small fraction of the cost incurred by other methods.

Consolidation of storage locations is one of the company's prime objectives, and as improvements are made in this direction, costs go down.

The safety of the workers is considered in all storage operations. As the use of power lift trucks is increased, hand operations reduced, accident hazards are also reduced.

Storekeepers are charged with the responsibility of storing materials economically, safely, and in such a manner that all of it will be available for use as required. Materials are moved to machining or assembly locations upon proper authorization from the scheduling division.

Although all materials are controlled on the basis of a predetermined schedule, some hardware items are controlled on a minimum basis. This minimum is based on actual needs and procurement time. Records are kept only of the quantity in stores. Receipts and disbursements to and from stores are the only postings on such records.

Quantities of finished materials used in prime products and special attachments are prepared by the tabulating section and are posted to the records at the end of each month. Other postings of disbursements of stock are made daily as such transactions occur.

These postings include deliveries to parts, research,

and other nonproductive departments. Scrap losses as reported from the factory are tabulated and posted daily.

This method of stock control is designed to keep the inventory low, yet high enough to permit economical and uninterrupted production of products for sale. It is flexible enough to permit necessary engineering changes within a reasonable time with a minimum loss through such obsolescence.

To schedule effectively demands that requirements and work capacity be known months in advance. At Caterpillar, as well as in any business, there is a constant change in requirements and work capacity, therefore once a month the tabulating section prepares a machine load distribution tabulation by months. This is prepared by utilizing master decks of punched cards set up and maintained for this and other purposes. There are essentially two different master decks required. One is for figuring piece part requirements of prime products, special attachment and parts service. In this deck the following information is punched: Part number, model, group or assembly number, and quantity used per model group or assembly. The other master deck contains the following punched information: Part number, operation number, machine class, factory group, machine bench or weld number, set-up time and running time per piece. From these master decks, and the monthly requirements taken from the executive production schedule, special attachment authorizations and parts department orders, the total pieces and total hours of work per month are figured for each machine.

W-1
C-1
S-1
3

PRODUCTION WORK ORDER

TOTAL COPIES TR | SHEET NO. | PRACT LOT 350 | PART NO 5B-1899

OPER NO.	MACHINE LOC CLASS	MACHINE NO	BASE TIME HRS PER SET-UP	BASE TIME HRS PER PIECE	BURDEN HOURS	PERFORM HOURS	OPERATION
							PAINT:
1	P7H A17S P7H L21T	2096 1155	4.00	.143 7			DRILL, REAM, CTR'BORE, FORM RADIUS, TURN, FACE & CHAMFER FLANGE SIDE, TURN, FACE AND CHAMFER END OF HUB
2	P7C D20M	7165	.50	.0133 75			DRILL BOLT HOLES
3	P8D D8S	8805	.80	.067 15			DRILL HOLES IN ARMS
4	P8D K8H	7873	.40	.010 100			BROACH SPLINE
5	P8D D8S	8805	.50	.026 38			DRILL CROSS HOLE
6	P8D D8S	8805	.30	.012 83			SPOTFACE (3) HOLES
7	P8B E2B	B55	.20	.0256 39			REMOVE BURRS REPLACES 1A 8729 PARTS GRP. #21. PARTS GRP. NO.

FILE	IDENTIFICATION	CHECK OUT	ROUGH STORES	FINISHED STORES
COMP. PARTS	EFFECTIVE DATE		CURRENT	SPEC. ATTACH. / NON-CURRENT
1B 8941 5B 1116 2B 4902 3B 6524 1B 6761 1B 7753 1B 8729	MATERIAL: C.T.#1E42 STEEL FORGING (PICKLED) PART NAME: FAN SPIDER MACHINE PREPARED / BASE TIME: MKM 11-8-45 FS 11-10-45 MACHINE RECORD: MKM 11-12-45 EH 11-14-45 9B 1155 S. (PERMISSES SHEET) DATED: 10-26-45 CODE: 26 MASTER TYPED: MKG 11-27-45 DATE COMPLETED (FOREMAN'S STD.) ORDER DATE: 5-1-46 SCHED. LOT SIZE: 365 SCHEDULE: 8 PART NO 5B 1899			DELIVER TO Q3A

Additional helpful information for plant management executives and production control men will also be found in the following articles which have appeared recently in THE IRON AGE. *"So You're Designing a New Product!", Oct.* 31, 1946, *p.* 36; *"Setting Up for a New Product," Nov.* 7, 1946, *p.* 58; *"Planning a Plant Layout," Dec.* 19, 1946, *p.* 73; *"Sampling Techniques Applied to Quality Control," Dec.* 12, 1946, *p.* 70; *"Practical Aspect of Modern Quality Control Methods," Apr.* 10, 1947, *p.* 66; *"Cost Reducing Program for a Job Shop," Sept.* 26, 1946, *p.* 56; *"A Plan for Cutting Production Costs," May* 1, 1947, *p.* 54.

This report is prepared to cover all known requirements within 90 days of the effective production dates. At the same time it is projected for the following 4-month period so that it is possible to see up to 7 months in advance the approximate load. This also affords the opportunity to review each month four times.

Each month a new month's requirement is picked up and the first month of the previous tabulation is dropped. This method of tabulating machine loads reflects each month all changes that have occurred since the previous tabulation for the months shown. Projecting the machine load 7 months in the future, along with reviewing the load each month as the production date approaches, gives everyone a common, firm basis on which to do advance planning. There are three copies of this tabulation made; one is sent to the planning department, one to the shop control office, and the third copy is for the scheduling division.

Scheduling must be flexible. The most carefully prepared schedules may be suddenly upset by unforeseen changes such as failure of vendor to deliver material or tools, power failure or machine tool breakdown, engineering changes, increases or decreases in sales demands, strikes, and many other factors.

When this occurs the scheduling unit rapidly improvises or reschedules to meet the new conditions and to keep the proper balance between work capacity and work load. When schedules are delayed or when possible delay can be foreseen, remedial action is taken to place the shop on schedule. This action may require reallocation of personnel, authorizing of overtime work for a brief period, allocation of a portion of the job to another group (machine), or the procurement of additional personnel. In extreme cases where current work load prevents the addition of new work, the condition is solved by either postponing the new work, by rescheduling current work to provide time, by obtaining additional equipment, or by placing the work on the outside. In any case the action required becomes management's decision, based upon the facts presented by the scheduling and planning departments.

With few exceptions, scheduling within the month is left in the hands of the shop supervisor. Within

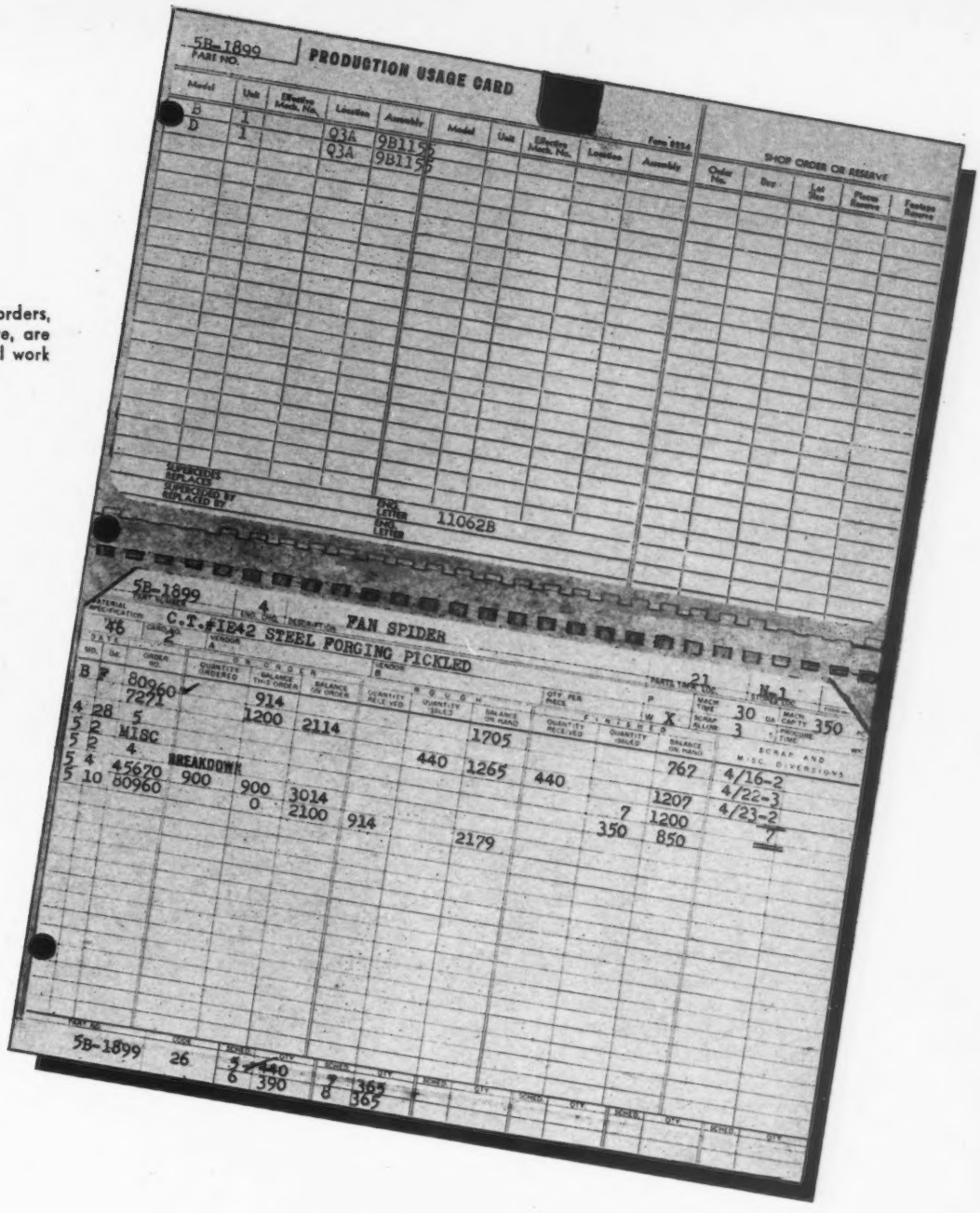
LEFT

PRODUCTION work orders, in the form shown here, are issued to the shop for all work to be performed.

o o o

RIGHT

STOCK records of the type illustrated here are maintained for every part used or manufactured.



the month there is no one better qualified than the production shop supervisor to schedule the flow of material through the shop to the assembly line and parts department. The supervisor, then, is the manager, who, when supplied with the proper tools, material, work orders, manpower, etc., meets a realistic schedule. He provides the maximum of flexibility within a month since he has enough latitude to cope with the hour-to-hour and day-to-day problems encountered. His constant vigilance, ingenuity, knowledge, and aggressiveness, coupled with the proper authority, make the best combination for production scheduling.

In addition to the monthly production work order issued by materials division which tells the supervisor what month the finished stock is needed on the assembly line and for the parts department, scheduling prepares a weekly tentative building schedule which is an interpretation of the monthly prime products schedule. The amount of each prime product to be built daily is shown for the next current week. This schedule is distributed to all factory supervision every Thursday so the productive shop can gear closely controlled items to assembly line needs and factory material control personnel can report from physical assembly line checks to proper shop supervision those close items for which they have less than a 3 days' supply.

In scheduling, a production department progress report is compiled each week to present a concise picture of the progress being made toward complying with the effective dates established for initial production of new models and major engineering changes. This report is distributed to the various department heads concerned.

The progress report contains the status for the current week, plus that of the previous week, to reflect the progress that has been made by the engineering department in releasing the groups, the planning department in processing them, and the tool design and tool room toward completing the necessary tooling, as

MACHINE load and other service operations for production con trolling are performed at Caterpillar in this tabulating section.

well as the purchasing department in delivering the first lot of material.

This report is also used as a common basis for discussion in the scheduling meeting that is held each week on the day following the issuance of the report, and from these meetings headed by the production manager, top management, sales and merchandise departments are kept informed. It serves equally well in presenting an advance picture of the forthcoming work for each of the various departments.

In Caterpillar shop control offices, factory material control personnel are kept informed of the material conditions by the materials division. These factory material control people report direct to the scheduling division; however, they work very close with the production shop supervisors in carrying out their various functions.

At request of shop supervisors, material control people order in material for the shop to machine or assemble. They physically count material started and finished, report all scrap and with factory accounting clerks (timekeepers), close out production work orders which show amount started, amount scrapped, and good pieces finished. All shop diversions to parts department (for parts service) are handled by the factory material control people as well as sending to the production assembly lines their requirements.

A further discussion of production control methods at Caterpillar, in which the author will outline the specific functions of the various units which make up the production control department will be published in a subsequent issue.—Ed.

Plastic Tubes Cut Plating Solution Loss

SAVINGS of from 50 to 75 pct of the chromic acid ordinarily lost in chromium plating tanks through use of a protective blanket of plastic tubes floated over the surface of the solution have been reported by the Udylite Corp. of Detroit. Loss of chromic acid sucked up by the ventilating system, loss of heat from the bath and complaints of air polution from fumes have long plagued the plating industry.

These plastic tubes, known as Chrome-Lock tubes, are extruded of Styron (Dow polystyrene) and were developed in conjunction with the Dow Chemical Co. The 3-in. tubes are closed at each end to resemble miniature pillows and are floated on the chrome bath solution in sufficient depth to blanket the bath and reduce the escape of fine spray considerably, in the plant of Electro-Finishing Industries, Detroit. When a rack of objects is lowered into the solution, the tubes move apart easily and then close over the rack spine during the operation. The thicker the blanket of tubes, the less the chromic acid loss. About 1½ lb of tubes are necessary for a 1-in. blanket over 1 sq ft of solution surface, and 3 lb per sq ft for a 2-in. blanket.

In addition to chromic acid savings, the protection given to plating room employees is also said to be important. Experiments have also revealed that less heat is required to keep the bath at correct operating temperature and a saving of heat and electric power is made possible by cutting down on the quantity of air withdrawn by the blower. Styron was chosen for these tubes because of its high resistance to acids and alkalies and shatter-proof qualities.

Lime Treatment Of Waste Pickle Liquor

By C. J. LEWIS
Technical Director,
Warner Co.,
Devault, Pa.

Efficient treatment of waste pickle liquor prior to disposal, and disposal of waste liquor-lime sludge, are frequently difficult problems to solve for steel plants employing pickling acid operations. The author presents a consideration of various factors which govern the selection of proper liming material, from the standpoint of chemical reactivity and economy. Methods of preparation of liming materials and methods of efficient application of these materials to spent pickle liquor are also considered, as well as several suggested techniques for sludge disposal.

ALTHOUGH the amount of waste pickle liquor is small, relative to the total burden of industrial, municipal and acid mine wastes finding their way into public waters, it creates one of the major waste disposal problems of the steel industry.

Waste pickle liquor is commonly referred to as being either "conventional" or "stainless." The former is primarily water, ferrous sulfate and sulfuric acid; the latter, in addition to water, is chiefly a mixture of nitric, hydrochloric and hydrofluoric acids, and corresponding salts of the metals involved.

Generally, conventional waste pickle liquor is of no economic value. When treatment is necessary, the addition of liming materials, followed by dewatering and disposal of the resulting sludge on a waste dump is usually the most practicable procedure. Exceptions may occur when the conventional waste is convenient to chemical operations which can utilize the iron and sulfuric acid values. Such cases must be appraised on their individual merits.

In contrast to the sulfuric acid type, stainless waste pickle liquor contains values which render its further processing more economically attractive. One investigation now in progress on the stainless waste seeks to recover nickel, chromium and fluoride for return to the smelting furnace, with nitrate content recovered as calcium nitrate for fertilizer use. Stainless pickle liquors, however, may be disposed of through lime treatment, and the following observations on the lime treatment of conventional waste pickle liquor apply also to the stainless type.

The disposal problem should be approached initially by attempting to reduce the amount of waste pickle liquor involved. This suggests a survey of pickling practices, with emphasis on the efficiency of the pickling bath, the human factors involved, and the extent to which the spent pickle is diluted with wash waters. Where washings can be segregated, the treatment of the reduced volume of waste pickle liquor is simplified. This is contingent, however, upon the washings being acceptable for discharge untreated or upon the feasibility of their separate treatment followed by recycling. Cleaning processes such as the caustic bath or shot blast, intended to minimize or eliminate acid cleaning, should be investigated.

Legal Aspects of Waste Disposal

When determining the amount of waste pickle liquor to be treated, a dumping schedule should be developed. This tabulation will cover an operating cycle in terms of volume and chemical composition. Such knowledge, especially in the case of batch pickling, is necessary for the subsequent design of the treating plant and is quite useful when discussing the waste disposal problem with municipal, state or federal authorities. In disposing of waste pickling acids in compliance with stream pollution laws, close cooperation will usually be required with the authority having jurisdiction at the point where the waste discharge enters public waters. Those responsible for engineering the treatment plant should be thoroughly familiar with the laws applicable to industrial waste discharge. In some localities a waste may be acceptable which would not be tolerated in others. Stream standards vary in the different states, and often within the same state, depending upon the nature and "best use" of the stream or water course involved. Some sewage systems may welcome modest amounts of waste pickle liquor; others may accept it if partially neutralized;

still others may reject it completely. It should be borne in mind that the development of stream pollution programs in some areas may be in a state of flux, so that installations for treating waste pickle liquor in terms of today's requirements may be inadequate to meet tomorrow's standards. Therefore, the steel industry, confronted with the disposal of its waste pickle liquor, must not fail to consider the municipal program for sewage treatment or the long range planning for improvement of the public waters affected.

Selecting Proper Liming Material

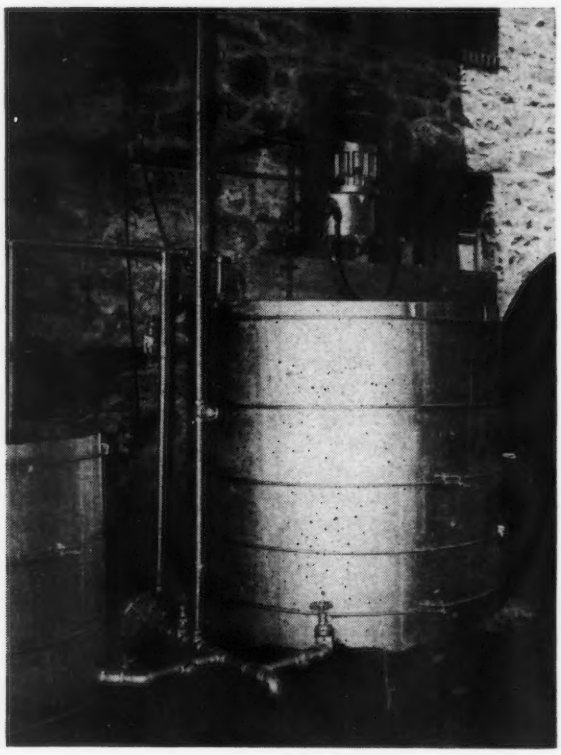
Having determined the volume and concentration of pickle liquor to be handled, the rate at which it is accumulated or must be discharged, and the probable degree of treatment required, the method of treatment may be considered. Circumstances will, in most cases, favor a treatment process based on the use of liming materials. Exceptions will occur, but discussion of other disposal processes is beyond our present scope.

The following fundamentals influence the selection of proper liming materials: Law limestone, either dolomitic or high calcium, will neutralize substantially all of the free sulfuric acid and precipitate practically all of the *ferric* iron content of waste pickle liquor. Using limestone, pH values in the neighborhood of pH 5 may be obtained. Dolomitic limestone, however, reacts relatively slowly with waste pickle liquor and may not be practical. High calcium limestone, on the other hand, is relatively quite reactive. The use of limestone may be advantageous when it is desired to neutralize mineral acidity only; or when the unit of basicity as limestone costs considerably less than an equivalent unit as quicklime.

The rate at which either dolomitic or high calcium limestones react with waste pickle liquor is markedly affected by the exposed surface area of the limestone. Coarse aggregate, say from 1 to 3 in., might be used under conditions permitting long contact time. The formation of insoluble calcium sulfate on the surface of the limestone aggregate, particularly in the case of high calcium limestone, often renders such treatment unattractive. Pulverized limestone, either dolomitic or high calcium, must be used under conditions of continuous agitation. If ample retention time is available, it may be feasible, particularly when using high calcium pulverized limestone, to neutralize free acid and in addition precipitate practically all of the iron content of the pickle liquor as well. This is possible because, with the pH values obtainable using limestone, ferrous iron slowly oxidizes to the ferric form which, in turn, precipitates. Heat and aeration enhance this reaction.

However, when the amount of pickle liquor is considerable, or minimum time for treating cycle is desired, lime treatment is preferable. In a waste pickle liquor-lime system, the precipitation of ferrous iron will be substantially complete when a pH value of about 8.4 is reached. However, pH values of 9.0 to 9.5 may be necessary to precipitate practically all ferrous iron under certain conditions. Either high calcium or dolomitic lime may be used. First consideration should be given to the cost of unit basicity. Dolomitic limes, on a weight basis, contain more available basicity than the corresponding high calcium type. The price of the lime at source plus freight rates govern the delivered cost of unit basicity. Dolomitic limes react with waste pickle liquor somewhat more slowly than high calcium limes, particularly after the pH of the system is on the alkaline side. Moderate excesses of dolomite lime offset this and may often be employed without adversely affecting the cost in relation to high calcium lime. Because its magnesium content yields soluble magnesium sulfate, dolomitic lime merits careful evaluations as to its effect on sludge and effluent characteristics.

Either hydrated lime or quicklime may be used for treating waste pickle liquor. The higher cost of unit basicity in hydrated lime places it at a cost disadvantage relative to quicklime. However, where the quantities of lime involved are small, the higher cost of hydrated lime may be outweighed by the lower cost of handling the hydrated form. Hydrated lime in bags requires no special unloading or storage facilities; it lends itself well to truckload deliveries; and its use does not involve slaking equipment. However, hydrated lime should be made into a water slurry before it is added to the waste pickle liquor. Dry addition allows the hydrate particles to become coated with sludge before they can completely react, thus causing a substantial wastage of the hydrate.



PILOT plant reaction tank and mixer to study the lime treatment of waste pickle liquor.

Bagged quicklime is usually available in 80-lb. waterproof bags. It may be transported and stored similarly to hydrated lime. Subsequently, however, it must be slaked as in the case of bulk quicklime. Bagged quicklime, in some localities, may represent unit basicity at a cost intermediate between hydrate and bulk quicklime. Each individual case must be judged on its own merits when deciding between hydrated lime and quicklime in bags or in bulk.

It may be argued that where the equivalent of 10 tons or more per week of quicklime is required, economy dictates the use of bulk quicklime. Quicklime should be slaked and made into a water slurry before

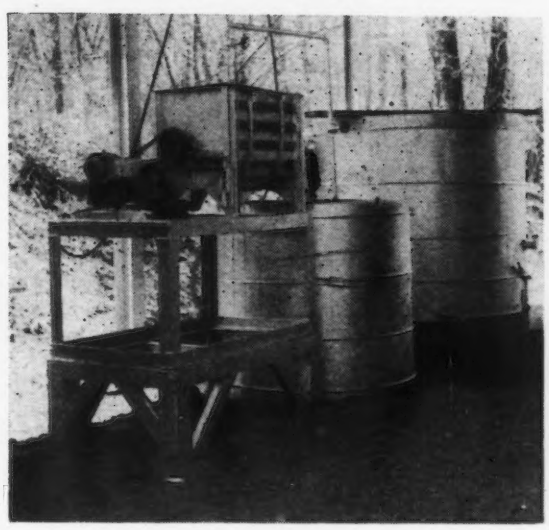
addition to the waste pickle liquor for the same reasons as in the case of the hydrate.

Applying Liming Materials Efficiently

Limestone—Having selected the type of neutralizing agent, whether dolomitic or high calcium, limestone, hydrate, quicklime or combinations thereof, the design of the treating plant itself may be considered. Every effort should be made to prevent the erection of an elaborate or monumental installation. It must be borne in mind that a waste is being treated to produce another waste and that the treating plant is not likely to be an exhibit. Likewise, changing perspective, both technical and social, may act to obsolete or modify the plant long before it has been fully depreciated. Therefore, the unit should be simple and flexible. The treating plant, for convenience of discussion, may be divided into three units consisting of the lime unit, the neutralizing unit and the sludge disposal unit.

Discussion of the application of raw limestone in the aggregate form will not be attempted since its use constitutes exceptional cases. If the use of pulverized limestone is contemplated, it may be obtained either in bulk or in the popular 80-lb paper bag. The bagged material can be delivered by cars or trucks and can be unloaded and placed in storage without special equipment. For bulk limestone, pneumatic equipment may be used to convey the limestone from car to storage bin, or a unit consisting of track hopper, screw conveyor and elevator to storage may be employed. Pulverized limestone, being inert, does not require airtight storage. It does not easily "hang up" in properly designed storage bins and can be discharged from storage by standard equipment. Unlike hydrated lime and quicklime, pulverized limestone is best added to waste

LIME slaking and slurrying equipment. Waste pickle liquor holding tank in background.



pickle liquor in the dry form. The relatively large surface area of pulverized limestone favors violent evolution of carbon dioxide, thus preventing the sludge from coating the surface of the reacting limestone.

Material in bags may be added by sliding the bag along a suitable chute having a sharp projection for knifing through the paper, thus allowing the contents of the bag to drop freely into the treating vessel. The paper bag, of course, should be discarded separately. Since the weight of the limestone in each bag is known with practical accuracy, it is possible in this manner to add the required amount of limestone to a known volume and concentration of waste liquor. Bulk limestone may be added through a chute leading from a weigh hopper. It is best to measure the addition of the bulk limestone or considerable wastage may occur. The large volumes of carbon dioxide gas given off during the limestone addition should be vented by fan or other positive means. This gas is, of course, heavier than air and can be a hazard if proper provisions for its takeoff are not made.

Hydrated Lime—Hydrated lime is almost always obtained in 50-lb paper bags and should be protected, during storage, from excessive heat and humidity. Hydrated lime slowly absorbs carbon dioxide and moisture through the bags and, if improperly stored, will tend to cake. Under unusual or special conditions, bulk hydrated lime might be obtained in covered hopper cars and placed in tight storage. Equipment for handling bulk hydrate must be selected and operated with care, due to the tendency of hydrated lime to "channel," "flood" and "hang up." Air jets on tanks and vibrators on chutes have been found useful when discharging hydrated lime from bulk storage. Hydrated lime should be made into a water slurry before application to the waste pickle liquor. This is best done on the batch principle. It may not be necessary to accurately measure the amount of hydrated lime for a batch of slurry since the proper addition of sufficient water to produce a free-flowing slurry is the only requirement.

It is considered good practice to first bring the hydrate in contact with sufficient water to result in a heavy cream, after which the remainder of the water may be added. A positive mixing mechanism is a requisite, and after the slurry is made up the hydrate should be held in suspension by continuous agitation. For mixing and holding the slurry, a wood tank is satisfactory. The slurry may be pumped to the treating vessel but gravity flow should be utilized when possible. When treating on a batch basis, it is not necessary to measure the hydrate addition, since the end point of its reaction with waste pickle liquor can be detected with sufficient rapidity to prevent wastage of the hydrate.

Quicklime—The use of quicklime involves more specialized equipment. Application of bagged quicklime will not be discussed, although if circumstances should warrant its use, the same general principles apply as in the case of bulk quicklime. Bulk quicklime may be conveniently obtained in either the ground or pebble form. It may be unloaded and conveyed to storage by means of pneumatic equipment, or the screw conveyor-elevator combination may be used. Quicklime can be unloaded from container car equipment by discharging the container directly over the storage bin. Quicklime storage facilities should be fireproof and as airtight as possible. Serious fires have resulted from water coming in contact with quicklime stored near combustible materials. There are a number of time-proven devices for the discharge of ground and pebble quicklime from storage bins.

Quicklime should be slaked and slurried before addition to the waste pickle liquor. This may be on a continuous or batch basis. Lime slaking equipment may be simple or elaborate, depending upon the amount of quicklime being processed and the life expectancy of the equipment. In order to properly slake, the quicklime must react with water at near boiling temperatures. The heat of the slaking reaction is usually more than sufficient to achieve near boiling temperatures, if

the ratio of water to quicklime is within proper limits. When an excess of water during slaking is necessary, supplementary heating, usually with steam, is recommended. After slaking, additional water should be added to produce a final lime slurry which is free-flowing and easily pumped. Slurries containing more than 20 pct quicklime, by weight, usually do not have desirable free-flowing characteristics. When adding the slurry to waste pickle liquor, the same observations apply as in the case of hydrated lime slurry.

Another factor to be taken into account when quicklime is being used is the disposal of the inert, nonslakable core and residue common to all quicklimes. This will average from 2 to 4 pct, by weight, of quicklime. Although there are quicklimes of high purity averaging less than 1 pct core, others may contain as much as 7 pct, by weight, core. The method of handling core depends largely upon the form and amount of quicklime used. In the case of ground quicklime, much of the finely divided core is carried along in the lime slurry, goes through the neutralizing process and ends up in the final sludge. However, such core may settle out at low velocity points in the system. In the case of pebble lime, the core from rice to marble size will usually remain in the slaking vessel. It may be removed either continuously or during periods of shutdown. A mechanical installation is preferable for the continuous removal of core, but on a batch basis this can be done manually. Wood tanks may be used for slaking quicklime, although steel units are obviously more resistant to the attending heat and abrasion. Continuous agitation during slaking and for subsequent slurrying is a necessity. Quicklime should be measured, whether slaked continuously or in a batch, in order that the optimum water: lime ratio may be maintained.

Use Simple Neutralizing Equipment

The batch treatment system is the most popular, although continuous lime treatment of spent pickle liquors is entirely practical. The actual bringing together of the liming materials and waste pickle liquor offers opportunity for ingenuity and innovation. Effective methods may vary from the introduction of lime slurry and waste pickle liquor to the intake of a centrifugal pump in one case to the arrangement wherein one wood tank serves as lime slaker, neutralizing unit and settling basin, in another. Aspects of the batch method only will be discussed.

Choice of one v. two treating tanks depends largely on the amount of liquor to be treated during any given period and the facilities for waste liquor storage in case of breakdown. The employment of more than one tank adds greatly to overall flexibility.

Either pulverized limestone or lime slurry may be added to pickle liquor as rapidly as feeding equipment will permit, providing agitation is adequate. After the required dosage of high calcium pulverized limestone has been added, the neutralization of mineral acidity may be complete in about 10 min, although continuous agitation for as long as 30 min is recommended to permit the attainment of maximum pH and escape of mechanically entrained carbon dioxide. In the case of lime slurry, the complete precipitation of ferrous iron under conditions of vigorous agitation may be complete in as little as 5 min after the required dosage of lime slurry has entered the system. A treating cycle may require from 30 to 60 min, depending largely upon the consistency of the final sludge which affects the rate at which the reaction tank can be emptied.

The reaction tank may be constructed of steel although a wooden tank is preferable. The advantage of special corrosion-resistant lining to assure maximum equipment life must be weighed against the additional cost. Neutral or alkaline sludges resulting from liming have practically no corrosive effect on steel or wood. It is good practice to add the liming material to the waste pickle liquor rather than the reverse, if wastage of the liming material is to be held at a minimum.

In addition to equipment for bringing pickle liquor and liming materials to the treatment tank and for vigorous agitation, facilities should also be provided for the introduction of water to the system. Usually, conventional spent pickling liquors and practical lime slurries unite to produce a viscous, slow-flowing sludge difficult to pump. Water must often be introduced concurrently with the liming material or shortly after the required amount of liming material has been added. Likewise, it is desirable to have a hose or other easily directed water jet available for washing sludge from sides of treating tank and shaft of the agitator. Such sludge tends to accumulate, especially at the level of the tank contents. End point in the case of lime treatment may be determined by instruments or by the more simple testing of the tank contents from time to time using a drop plate with phenolphthalein as indicator. The end point in the case of pulverized limestone treatment is less easily determined by chemical means, but the appearance of the sludge samples, especially with respect to entrained carbon dioxide gas, is a practical guide.

Sludge Disposal

The third phase, namely, the handling and disposal of the sludge, is, in many cases, the most bothersome part of the operation. The sludge itself is chiefly hydrated ferrous and ferric oxides, precipitated calcium sulfate containing two molecules of combined water, and unreacted liming materials. These solids are suspended in the liquid phase which consists primarily of water saturated with calcium sulfate and containing various amounts of magnesium sulfate, depending upon the type of lime used and its method of application.

Economically, sludge is worthless. Considerable research is in progress pertaining to the economic utilization of this sludge. One process which has attracted interest uses the dewatered sludge in the fabrication of a wallboard type of construction material. However, methods for practical utilization of the enormous sludge potential have not been developed. Until it can be otherwise used, therefore, the sludge must be dewatered and eventually find its way to a permanent dump. In some instances, the sludge, without dewatering, can be run into slag dumps, quenching pits, deep wells or abandoned quarries.

However, where there is not such a fortunate disposal situation, lagooning has for many years supplied the best answer. Unfortunately, in localities where the greatest amount of waste pickle liquor is to be found, the ratio of evaporation to precipitation does not favor lagooning. But, since the solids in the lime-waste pickle liquor sludge settle and compact, and since ground seepage and evaporation gradually overtake precipitation, a lagoon, when idled, eventually becomes semisolid. The contents may then be removed by clamshell bucket or other suitable means and taken to dump or used for fill.

It has been said that lagooning is an art as well as a

science. It is beyond the scope of this article to discuss the engineering aspects of lagooning. It is well to know the geology of the terrain with respect to cracks or fissures in the natural rock, and to have some knowledge of the soil as regards permeability. Lagoons have been known to channel. Caution must be exercised when locating them near public waters. At least two lagoons are usually required so that one may remain quiescent while the other is being filled. Provision is usually made for the clear effluent to overthrow the lagoon. Sometimes gates are provided which can be lowered to drain off the effluent as settling proceeds.

The settling rate and volume of waste pickling liquor-lime sludges can be best determined on the particular pickling liquor and specific liming material employed. Settled sludge volume may range from 20 to 60 pct of the original. The employment of a number of small lagoons in series may in some cases be advantageous. When the semisolid sludge is eventually removed from the lagoon and taken to a permanent dump, the location of such dump with reference to public water must be appraised; since, while the sludge itself is practically insoluble in water, heavy rains or freshets may cause its mechanical entry into lake or stream.

For those having no available land for lagooning, sludge disposal is often a formidable problem. Waste pickle liquor-lime sludge usually settles slowly, and it has not been practically handled on vacuum filters. The dewatering of such sludge without lagooning or settling constitutes one of the major problems yet to be solved in perfecting the lime treatment of waste pickle liquor. Methods for enhancing the dewatering characteristics of the sludge through best selection of liming materials and the use of aeration and heat, as well as through direct application of chemicals are being investigated. In particular, the centrifuge is being explored as a possible means for practical dewatering of waste pickle liquor-lime sludge.

Summary

When waste pickle liquor must be treated before disposal, an appraisal of the technological, legal and economic factors involved will usually indicate that partial or complete neutralization with limestone or lime is presently the most practical procedure. If maximum efficiency is to be realized, considerable thought must go into the selection and application of the liming material. Limestone, hydrated lime or quicklime, either dolomitic or high calcium, may be employed in treating spent pickling acids. Each material possesses characteristics which must be weighed against such factors as, cost per unit of neutralizing value, amount of waste pickle liquor to be treated, desired effluent characteristics, time allowable for reaction, and sludge dewatering and disposal. Limestones may be used without prior wetting; hydrated limes should be water-slurried; quicklimes both slaked and slurried. Simplicity and flexibility should keynote the design of the disposal plant, since pickling techniques and stream pollution requirements are subject to change. Useful information on the handling of liming materials and their application to waste pickling liquor may often be obtained from lime manufacturers. Disposal of waste pickling liquor-lime sludge is frequently a difficult problem. Lagooning is feasible when suitable locations and adequate space are available. Attempts to dewater conventional waste pickling liquor-lime sludge on filter or centrifuge have not as yet proved practical. Studies on this phase of the problem are receiving emphasis and should yield valuable data, particularly on sludge dewatering by means of the centrifuge.

Bibliography

(1) R. D. Hoak, C. J. Lewis and W. W. Hodge, Ind. Eng. Chem,. Vol. 36, 1944, p. 274.
(2) R. D. Hoak, C. J. Lewis and W. W. Hodge, Ind. Eng. Chem., Vol. 37, 1945, p. 553.
(3) R. D. Hoak, C. J. Lewis, C. J. Sindlinger and B. Klein, Ind. Eng. Chem., Vol. 39, 1947, p. 131.

Special Tractor Facilitates Truck Trailer Handling

A SPECIAL type electric tractor for hauling truck trailers from place to place after assembly has been designed jointly by Baker Industrial Truck Div., Baker-Raulang Co., Cleveland, and engineers of Fruehauf Trailer Co. This new tractor, shown in the accompanying illustration, is the production version of a prototype made from old truck parts which was so successful in service that the decision was made to equip several plants with these units.

A fifth wheel coupler mounted on an elevating platform permits lifting the front end of the trailer to facilitate movement. A feature known as the Baker No-Plug Controller compels drivers to use acceleration steps, reducing maintenance, saving power and increasing battery life as well as the life of the truck. Forward and reverse movement is controlled by one handle. Burning of controller contacts is minimized through a contactor interlocked with the controller and brake which makes and breaks the travel motor circuit, confining arcing to the contactor itself. As the circuit can be closed only with the operator sitting on the seat and the controller in first speed position, injury or damage from starting without the operator in position is said to be eliminated. The travel motor in this tractor is described by the manufacturer as developing the highest horsepower and containing more copper and iron than any other vehicle motor of the same size.

SPEAKERS' table at the ASTM annual dinner. Left to right—J. F. Vogdes, Jr., director, Philadelphia Committee, Pennsylvania Economy League; R. L. Templin, assistant director of research and chief engineer of tests, Aluminum Co. of America, ASTM vice-president; H. F. Moore, research professor of engineering materials, emeritus, University of Illinois; P. H. Bates, ASTM past president; A. C. Fieldner, ASTM honorary member; G. H. Clamer, president, Ajax Metal Co.; T. A. Boyd, head, fuel department, Research Labs., General Motors Corp., ASTM incoming president; A. W. Carpenter, manager of testing labs., B. F. Goodrich Co., ASTM retiring president; W. H. Fulweiler, ASTM past president and honorary member

Importance of Research Activities

T. A. Boyd elected president of ASTM . . . Use of radioactive tracers seen as new metal research tool . . . Marburg lecturer stresses importance of engineering laminates . . . New type magnetic flaw detector described.

UPHOLDING its policy of presenting a technical program premised on the objective "Promotion of Knowledge of Materials of Engineering, and Standardization of Specifications and Methods of Testing," the American Society for Testing Materials welcomed an enthusiastic audience of members and nonmembers to its 50th annual meeting in Atlantic City, last week.

The feature of the week-long meeting, the annual dinner, was highlighted by president A. W. Carpenter's annual address "Our Stake in Materials Progress," in which Mr. Carpenter, manager of testing labs., B. F. Goodrich Co., reviewed the progress of the ASTM in the past 50 years, and stressed the important relations of research not only in the society planning but for all industry concerned with materials. Newly elected officers introduced to the dinner gathering included: incoming president, T. A. Boyd, head, fuel department, Research Labs., General Motors Corp.; incoming vice-president, J. G. Morrow, metallurgical engineer, Steel Co. of Canada, Ltd.; incoming members of the board of directors: T. S. Fuller, engineer in charge, works laboratory, General Electric Co.; E. G. Ham, technical director, John A. Manning Paper Co.; J. J. Laudig, research engineer, Delaware, Lackawanna & Western RR Co.; H. L. Maxwell, metallurgist, technical library, du Pont de Nemours & Co.; and L. J. Trostel, chief chemist, General Refractories Co. Laboratories.

Some rather interesting concepts were introduced by the guest speaker, R. K. Marshall, Franklin Institute and *The Philadelphia Evening Bulletin*, concerning "Materials Problems in the Atomic Age." He visioned that in the not too-far-distant future metallic and nonmetallic constituents would be rendered radioactive and added to ferrous or nonferrous alloys during the melting operation. Use of these "tracers" would then make possible observations, heretofore impossible, of phenomena occurring in subsequent fabricating and testing operations. Metallurgists were advised to embrace the study of the subject of radioactivity, so that when some of the current limitations to its industrial use are removed, the metallurgist will be in a position to apply the use of radioactivity so as to benefit the metalproducing and fabricating industry.

Pursuing a timely subject of wide, general interest, the 1947 Edgar Marburg lecturer, Prof. W. C. Voss, head of the department of building engineering and construction, MIT, indicated the rising importance of "Engineering Laminates." Engineering laminates, embracing metals, wood, plastics, and fabric, com-

of the society; R. K. Marshall, director, Fels Planetarium, Franklin Institute, guest speaker; F. M. Farmer, vice-president and consulting engineer, Electrical Testing Laboratories, ASTM honorary member; J. R. Townsend, materials engineer, Bell Telephone Laboratories, ASTM past president; J. G. Morrow, metallurgical engineer, The Steel Co. of Canada, Ltd., incoming ASTM vice-president; H. S. Vassar, ASTM honorary member; Dean Harvey, ASTM past president; W. C. Voss, head, department of building engineering and construction, Massachusetts Institute of Technology, Marburg Lecturer; C. L. Warwick, ASTM executive secretary.

Stressed at ASTM Annual Meeting

bined each to each and each to the other, will undoubtedly, according to Prof. Voss, become one of our more important sheet and structural materials and by the proper selection of the individual sheets forming the laminate, will greatly affect the cost of many products and their durability.

In view of the important role of adhesion in laminates, the speaker devoted the major portion of his lecture to the various problems that must be overcome in order that behavior of a laminate can be predicted with confidence. He also presented some very interesting theoretical concepts regarding the mechanism and function of adhesion in operation.

Some of the fundamental factors in steelmaking that influence the impact strength and age hardening characteristics of steel used in the manufacture of tubular products were discussed by A. B. Wilder, chief metallurgist, National Tube Co., Pittsburgh, in his paper "Physical Characteristics of Steel for Tubular Products."

Results of his investigation, which involved bessemer, openhearth and electric furnace steels, indicated that deoxidation practice, pipe-making, shop fabricating variables, and heat treatment, are the important factors which may affect the impact properties or embrittlement characteristics of steel. The steelmaking process, acid bessemer, basic openhearth, or electric furnace, is of secondary importance.

The development of a practical inspection test method, including instrumentation, for the inspection of the bore of ferrous tubes or cylinders, was described by C. H. Hastings, physicist, Watertown Arsenal, Watertown, Mass., in his paper "A New Type of Magnetic Flaw Detector."

A particularly difficult situation has been encountered in connection with inspection of inaccessible surfaces such as the bore of steel tubing or hollow steel parts. During war, a solution to this problem became a crying need because of the necessity for improving the methods of inspecting cannon-tube bores. Visual inspection of the bore surfaces of these tubes was, and is still, being carried on by means of the optical borescope. Proof tests are conducted as a final acceptance test on such tubes and as a supplement to other inspection tests. Some tubes having satisfactory metallurgical structure were failing during proofing, presumably due to flaws which were missed by the borescope. These methods are far too time-consuming and unreliable.

The electrical equipment and several inspection tests were described in detail by the author of this new method of detecting flaws in ferromagnetic materials. In this method, use is made of an electromagnetic pickup coil, sensitive to the magnetic leakage caused by flaws in steel magnetized by direct current and connected to an electrical indicator or recorder. Essentially, the work represents an attempt to substitute

instrumentation for the magnetic particles of the magnaflux method. This feature of combining the variable sensitivity of electronic recording with the possibility of detecting relatively deep-seated flaws, has not heretofore been realized by methods depending upon ac magnetic fields for detection.

The sensitivity attainable, expressed in terms of the depth of the shallowest surface flaw detectable, was found to be as small as 0.05 in.

Hastings pointed out that because of the small size of the search unit, it is applicable to the bore of hollow parts which are relatively inaccessible. An unexplored possibility opened up by this method is that, since

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W. C. VOSS, head, department of building engineering and construction, Massachusetts Institute of Technology, Marburg Lecturer.

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quantitative data are obtainable in the form of a chart record or meter readings, it may be possible to correlate the magnitude of deflections with the depth of detected flaws. In other words, it may be possible to measure hidden cracks as well as locate them if a number of parts of the same type are to be examined.

Tests Magnetic and Electrical Properties

P. E. Cavanagh, president, Cyclograph Services Ltd., Toronto, Canada, and research fellow, Ontario Research Foundation, presented a paper entitled "The Progress of Failure in Metals as Traced by Changes in Magnetic and Electrical Properties," in which he outlined the changes in magnetic and electrical properties accompanying the development of failure during rotating-beam endurance tests for six different metals and alloys.

All tests were performed with an Avery rotating-beam fatigue machine on standard specimens. A Du Mont Cyclograph was used to determine and record changes in magnetic and electric properties of the samples. The Cyclograph test coil which is placed about the specimen while an endurance test is in progress, is part of the oscillatory circuit. The readings of the Cyclograph are a function of the losses in the specimen. For ferrous materials the losses consist of hysteresis and eddy-current losses, which are a function of several factors, including the permeability and resistivity of the materials under test. These losses decrease the oscillator output. Suitable circuits provide a dc signal proportional to magnetic and eddy-current losses that can be recorded. The recorder paper is mechanically driven from the fatigue machine so that paper travel is proportional to cycles of stress.

In experiments made on ferrous and nonferrous metals run at 95 pct of the endurance limit, no continuing change in magnetic and eddy-current losses could be detected at the maximum practical operating sensitivity of the Cyclograph. This confirmed previous results obtained on various types of fatigue machines. In no instance could any further change in these losses be detected after an initial small change in the first portion of the test if the load was below the endurance limit.

Cadmium Proves Excellent on Springs

When testing at 130 pct of the endurance limit, easily detectable changes in magnetic and eddy-current losses do occur during failure.

Cavanagh indicated a practical use of the method in examination of metal parts in normal use under operating loads to determine whether they are beginning to fail. A recording taken over a length of time during normal operations should show no change in core, or eddy-current, losses at constant load if the part is to last indefinitely.

In view of the increasing importance of surface finishes in the application of mechanical springs, J. R. Gustafson, research department, Ford Motor Co., reviewed results of some interesting experiments conducted in connection with "Some of the Effects of Cadmium, Zinc and Tin Plating on Springs." Electrolytic plating offers an inexpensive method of applying good rust preventives and consequently cadmium, zinc and tin plating have been widely used as protective agents on spring parts. Plating, adherence and hydrogen embrittlement are known variables accompanying the use of these rust preventives.

The springs used in the investigation reported by the author were fabricated from valve spring wire, ASTM specification 230-41. Fatigue tests were carried out on the plated springs, in order to compare the effects of the electrolytically deposited metals on S-N relationships, the degree of scatter and the fatigue endurance limit. Conclusions that can be drawn from the tests are that cadmium does not affect the fatigue endurance limit of spring steels if properly deposited. Both zinc and tin have deleterious effects and based on evidence obtained cannot be recommended for springs subjected to dynamic load applications.

Salt spray tests at room temperature showed that cadmium offered the greatest resistance to corrosion when compared with zinc and tin. Zinc was a favorable second, but was found likely to break down more rapidly than cadmium once corrosion started. Assuming that 50 pct breakdown in the rust preventive corresponds to spring failure, zinc lasted 700 hr whereas cadmium lasted 900 hr.

Soldering Aluminum

By G. W. BIRDSALL
Reynolds Metals Co.
Louisville

NOT long ago, soldering aluminum was regarded as impracticable. However, tremendous strides have been made in overcoming the problems involved so that today there are a number of special solders that do a very creditable job of joining aluminum. In fact, sufficient progress has been made to warrant presentation here of a part of the available knowledge on good aluminum solders and how to use them.

Before a solder can be made to bond with the aluminum, the oxide coating must be removed and kept from reforming until the surface of the aluminum has been tinned. The soldering flux takes care of this function. The flux must also be fluid at soldering temperatures and be of such character that the solder can easily displace it at the joint. While dissolving the aluminum oxide, the flux should produce little or no attack on the aluminum itself. Otherwise there is a possibility of further chemical action with the aluminum from any flux not removed after soldering. Ease of removal thus is also a valuable flux characteristic. Solders used with flux are usually called "flow" type because of their easy flow characteristic.

Friction type solders rely upon application of a rubbing action down through the overlying layer of molten solder and against the aluminum surface to mechanically abrade and break through the oxide coating, the molten solder cover preventing reformation of the oxide. Thus an opportunity is provided for the solder to bond to the aluminum surface which is thereby tinned. After such tinning, two aluminum surfaces can easily be joined by sweating.

Another important factor involved in making good soldered joints in aluminum is how to prevent or minimize deterioration of the joint from electrogalvanic activity. Galvanic action occurs wherever two dissimilar metals are immersed in a solution that conducts electricity. All aluminum solders contain metals other than aluminum. So where joints are exposed to moisture, all the elements required for galvanic action are present.

As a result, a small electric current may flow, one of the metals may be dissolved and as a consequence, holes or pits may form, reducing the mechanical strength of the joint seriously.

Where no moisture is present to form a solution, it is evident that there will be no galvanic action. Also if the metals in the joint are close to each other in the electrochemical series, the current that flows will be extremely small and the reaction minimized.

Thus, if the soldered joints are to be exposed to moisture, be sure that the solder used is one which provides minimum reaction. The tin-rich solders with considerable zinc content are often preferred for this reason. The salt spray test will afford rather quickly a measure of the resistance to corrosion, including galvanic action. Outdoor tests on exposure racks apply a more representative test, but of course take much more time.

Reynolds laboratories are continually studying new developments in aluminum solders and fluxes. Their tests, while not yet complete, show that several solders now available have gone a long way toward the solution of this joining problem. These tests were made on single lap joints in 0.032 to 0.064-in. 3S aluminum, using an air-acetylene torch with a No. 24 tip. Space permits only a brief summary of results with some of the most promising solders:

"Alumaweld Special" solder and "Alumaweld All Metal" flux, made by L. S. Johnson Co., Chicago, showed good flow, freedom from formation of islands, sound bond, 650°F flow point. Tensile shear tests failed in the sheet with shear stresses developed by the solder up to 4460 psi. After 200 hr salt spray tests, shear tests produced failure in the sheet with shear stresses in the solder up to 4000 psi. After 4 months outdoor exposure, joints were intact and showed no appreciable corrosion.

Considerable work has been done with this solder. Where design permits, it lends itself well to dip soldering and shows excellent flow into intricate joints. Also, it may be replaced in properly designed joints.

"Eutecrod 199" solder and "Eutector 199" flux, made by Eutectic Welding Alloys Corp., New York, flowed freely and gave good bond strengths, shearing in solder at shear stresses ranging from 1300 to 3000 psi. Flow point, 450°F. These joints withstood the 200-hr salt spray test and showed no appreciable corrosion after 4 months outdoors.

Alsoco solder, made by Alsoco Corp., New York, is of the friction type and requires no flux. It tinned easily with only light pressure. Joints were sweated together readily. Melting point, about 550°F. Tests showed good strength, the solder in the joint withstanding shear stresses ranging from 2000 to 4000 psi, and developing these same good shear strengths after 285 hr in the salt spray.

Fundamentals of making a good soldered joint in aluminum are same as in other metals: Surfaces must be clean and free from foreign matter and objectionable grease; the metal parts being joined must be heated above the melting point of the solder; any flux used must be molten at temperatures below the melting point of the solder to avoid being entrapped in the soldered joint; obtain complete removal of any corrosive flux left after soldering.

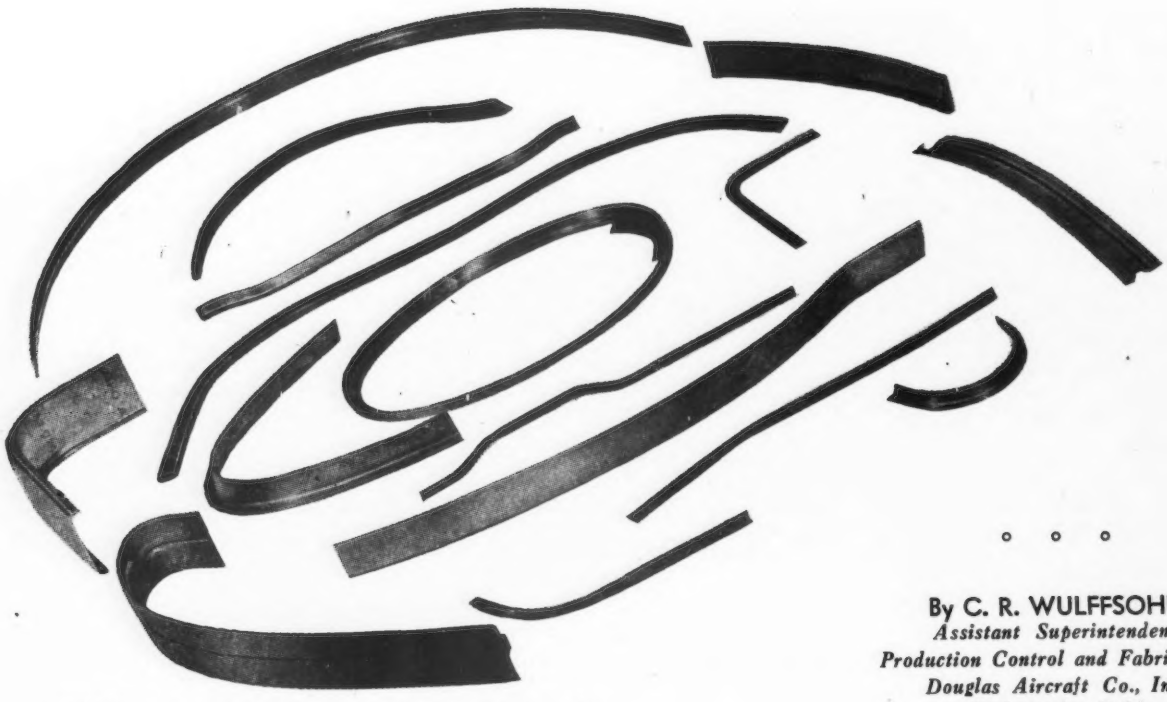
Cleanliness helps greatly. Mechanically abrading by scraping or sand papering the surfaces to be joined is recommended, as it removes the heavy oxide coating and leaves only a thin layer to be removed by the flux or to be broken through in tinning.

Friction type solders require tinning the surfaces to be joined by rubbing the aluminum surface underneath molten solder, thereby piercing the oxide film and allowing the solder to bond to the aluminum. After tinning, the surfaces are pressed together under a temperature sufficient to make the solder flow. Heat can be supplied from soldering iron, blowtorch, electric current, electric arc, etc.

Flow type solders (using flux) require no tinning; can be applied by repeatedly pouring the molten solder over the cleaned and fluxed surfaces to heat and wet them; or by immersing in a solder bath; or by conventional methods mentioned above.

Never allow solder or flux to become heated excessively, otherwise essential ingredients may be volatilized and an imperfect joint result.

. . . Small Sections



TYPICAL parts and profiles adaptable to preform rolling, which by nature of their odd shapes and designs do not readily lend themselves to standard tooling methods.

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By C. R. WULFFSOHN
Assistant Superintendent
Production Control and Fabrication,
Douglas Aircraft Co., Inc.
El Segundo, Calif.

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MASS production of light, relatively small items made from sheet metal or extrusions, in which compound curvatures, contours, and reverse contours and bends are required, tends to be an expensive process. Hand forming lacks uniformity and is extremely wasteful of time and energy; die forming under a press or drop hammer requires the preparation of expensive forming dies, and frequently necessitates multiple operations.

The method devised by Douglas Aircraft Co.'s El Segundo plant and known as the Preform Roll Process has, therefore, much to recommend it from the standpoint of speed, accuracy and economy. By this method, complete forming operations can be finished in one rolling operation by means of a power roll machine. Many of the rolls are standard equipment and the various forms required are developed and made to meet the requirements of each individual job.

This process is particularly adaptable to industries wherein large expenditures for stretch forming equipment are not justified. In many instances, stretch forming techniques would not be as satisfactory.

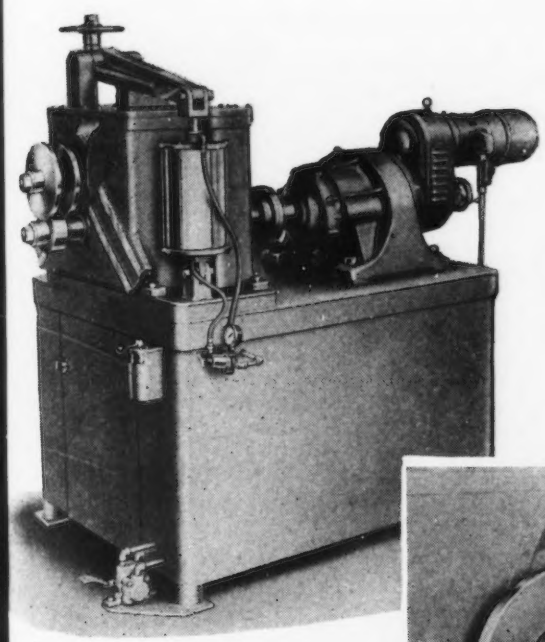
Briefly, the process consists of propelling a material through the rolls with the guiding protection and direction afforded by formed molds which control the contours and shapes of the finished product. Allowance is made in the molds for springback in the various curves and, assuming that the material is of consistent hardness and size, uniform duplication of parts can be obtained quickly and economically.

As shown in fig. 1, the machine used for this purpose is of quite simple design, and consists essentially of an electric motor with an infinitely variable ratio speed reducer and a housing containing the roll drive mechanism. A hydraulic cylinder applies pressure to the upper roll and is adjustable to give any desired pressure to meet the individual requirements of different types of work. This feature makes it possible to equalize pressure as the work rolls through, compensating for any variation in tooling dimensions. The work can be inserted between the rolls by means of a hydraulic foot control which permits the upper roll to lift clear. A magnetic brake on the 1 hp motor stops the rolls immediately when power is cut.

A simple example of the contouring of a small channel section is shown in fig. 2. Previously flanged on a power brake, the section is held to the contoured form by a small stop plate attached to the end of the block. This stop also serves as a gage to locate the position of the radius. The base block floats through as the part is being formed and also provides positive support. Fig. 3 shows the end of the operation with

s Contoured by Preform Rolling

Forming of extrusions and sheet metal stock into shapes requiring compound curvatures, contours and reverse contours and bends can be performed without the use of costly dies in a single operation by use of a simple power roll machine as described herein. Originally developed for aircraft parts, the new technique offers a wide field of application in the manufacture of metal furniture and trim.



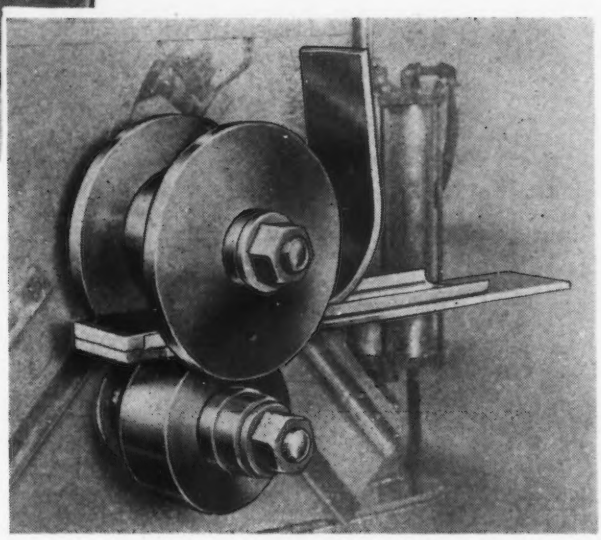
ABOVE

FIG. 1—The standard preform rolling machine is a simple, self-contained unit requiring a minimum of floor space.

o o o

RIGHT

FIG. 2—Start of a simple contouring operation on a small channel section.



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BELOW

FIG. 3—End of the operation shown in fig. 2. The stop block for retaining the workpiece is clearly visible at the top.

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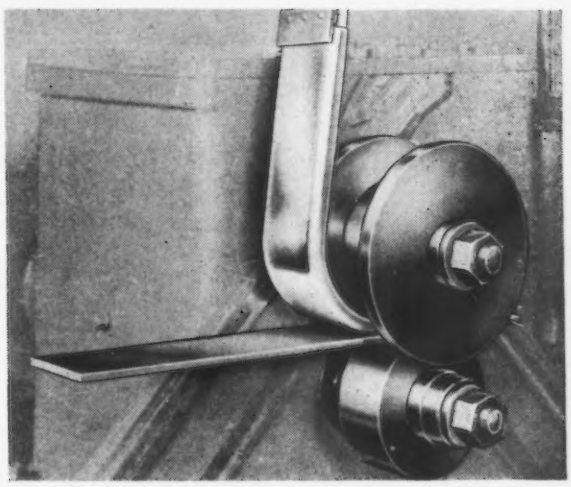
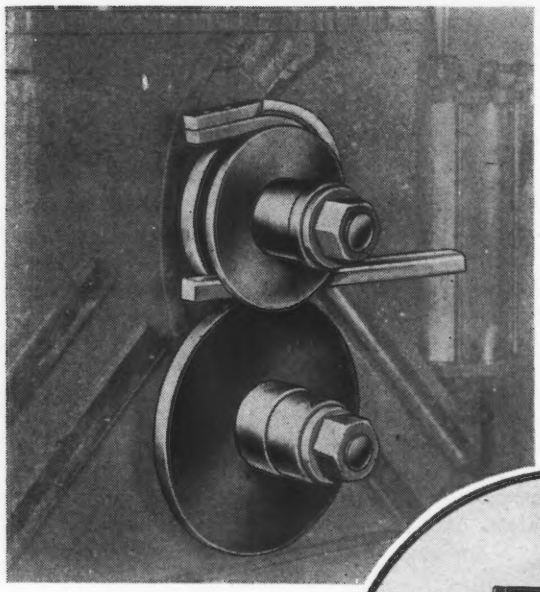
the part formed to the required contour, and also indicates more clearly the nature of the stop block.

Forming a sheet metal angle to a fairly small radius is illustrated in fig. 4. It will be noted that while the finished part is required to make a full 180° bend, the former block is bent several degrees beyond this to allow for springback. The lower guide bar carries a radius on one corner to match closely with the radius in the corner of the angle.

Another adaption of the process is the forming of a channel. As shown in fig. 5, the base block mates with the formed tool during the process to form a true rectangle, and includes twists, curvature and bends. The result is a straight strip of sheet stock formed into a hat section, joggled, contoured and twisted to form a stiffener for the inside of a cone-shaped assembly in a single operation. Formerly, these parts were produced on a drop hammer and excess material





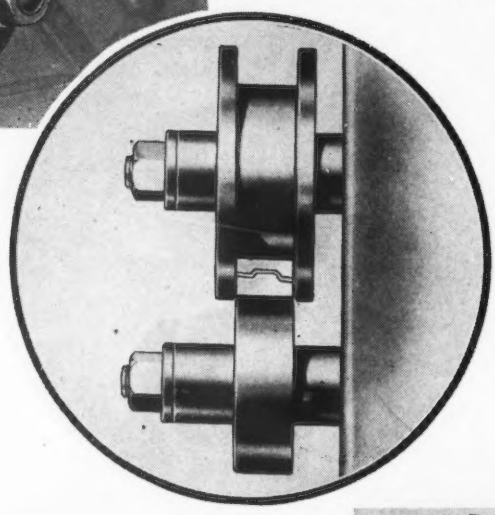
ABOVE

FIG. 4—Forming a sheet metal angle to a full half circle. Note that the former is bent to more than 180° to allow for springback.

o o o

BELOW

FIG. 6—Extremely difficult to form by any other process, this workpiece varies in both lengthwise and croswise contour, but is readily formed in one operation by preroll forming.



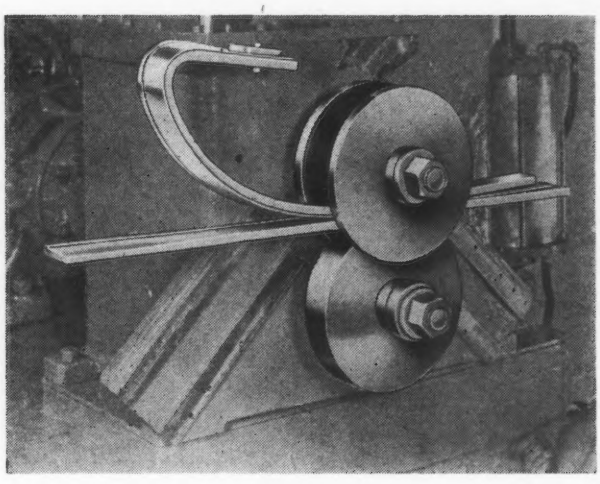
LEFT

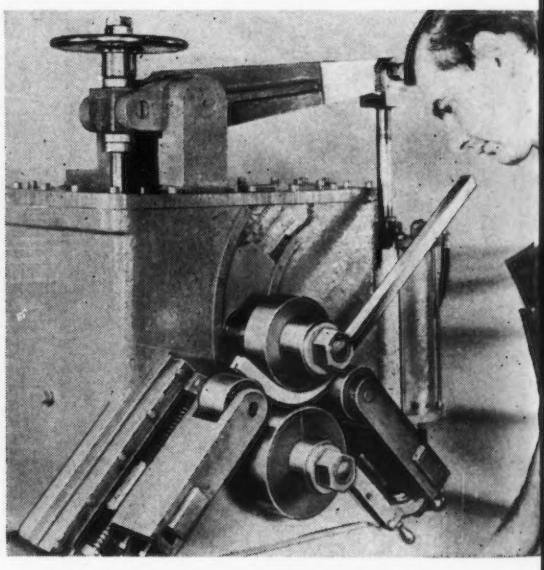
FIG. 5—When forming sections of the type shown here, it is necessary for the base block to mate with the formed tool to form a true rectangle between the rolls.

o o o

BELOW

FIG. 7—By the addition of side rolls the curvature of the form bars is produced on the rolling machine which thus creates its own masters.





hand formed to check templates; a long, tedious ... inaccurate performance in which no two parts w... identical, and which required a time expenditure ... 1½ hr per part. A multiple operation forming die ... the fabrication of this part would have cost $1... while the rolling dies cost only $100 and make poss... a superior product in every respect, from both a t... and quality standpoint.

Design and construction of the tooling is, of cou... most important to guarantee perfection in the finis... product, and the curvature of the form bars is p... duced on the rolling machine itself by the addition ... special side rolls attached to the face of the mach... as shown in fig. 7. Angle variance, slots, grooves, ... special recesses necessary to accommodate vari... shapes and types of stock are milled in the forms p... to the rolling operation. If the top and bottom blo...

trimmed off by hand. The production time was approximately 15 min per part as compared to 2½ min by the preform rolling process.

Contours are by no means confined to constant radius curves, but may combine several curvatures as indicated in fig. 6. In this case the crosswise contour is also variable throughout the length and reverses at the hooked end. The lengthwise contour is also variable, but all contours and curvatures are formed in one rolling operation in 5 min. Previously, this part was formed by hand over form blocks, and the contours must be mated to complete the boxing of the t... both are rolled together to the lofted contour of ... finished part, after which the bottom block is strai... ened out. A sample part is then passed through ... rolls and the amount of springback roughly calcula... The form is reshaped to compensate for the spr... back and the second trial made. Usually this wil... sult in a finished part to exact specification, altho... sometimes a second adjustment must be made.

After the tools have been proved the pressure ne... sary for exact work must be determined. If this is...

rect, material will tend to wrinkle and buckle and, e it has been established, the gage pressure reading stamped on the block for guidance of the operator. In some cases as, for example, when the workpiece d form block form a perfect rectangle throughout e entire length of the finished part, no base block is eded. As long as the former and workpiece are com- tely housed in on all sides between the rolls and ovided these are carefully set up, there will be no inkles from stretching or shrinking of the material. certain types of work that require a constant side ssure to eliminate tendency to wrinkle, a rubber d, retained by a heavy washer and bearing against the outside of the top roller may be necessary, and is indeed helpful in all cases.

The process is not confined to sheet metal or extrusions, but may also be applied to round and rectangular tubing. In this case, however, it has been found advisable to fill the tubing with sand and plug the ends with rubber plugs before making the bends. Applied to the forming of fuel and hydraulic lines, this technique should effect substantial savings in fabricating costs since complex curvatures can be found in a single operation, complete uniformity and interchangeability will be assured and no detailed inspection will be necessary.

Tin Coating Meehanite

CONSIDERABLE attention has recently been directed to the commercial possibilities of successfully coating iron castings with an adherent and continuous surface coating of metallic tin.

The two most successful procedures[1] are known as e fused chloride method and the fused nitrate thod. Both depend for their effectiveness largely the elimination or prevention of the graphite smear ich tends to prevent true bonding between the iron d the metallic tin facing. Accordingly, irons with gh graphite flake content present a more difficult oblem than those having controlled fine graphite ke distribution in lesser amount, such as may be nd in engineering type GA Meehanite of 50,000 i tensile strength, according to Dr. C. R. Austin, eehanite Metal Corp.

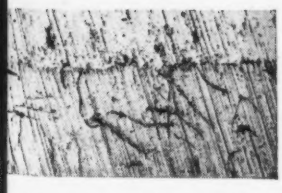
The accompanying photomicrographs illustrate the ue bonding which may be assured in tin coating a E type Meehanite casting (30,000 psi). Fig. 1 shows e results obtained by use of the fused chloride thod which may be outlined simply as follows in lation to method of handling the casting: (1) Mechanically clean the surface of the casting; (2) preheat to 400° to 480°F after coating with zinc-sodium chloride solution; (3) dip into salt bath consisting of 82 pct zinc chloride and 18 pct sodium chloride for 20 to 40 sec at 570° to 660°F, and (4) immerse in tin pot held at 570°F with layer of chloride flux and hold 3 to 30 min. Air cool.

The photomicrographs in fig. 1 illustrate the various stages in preparation of the specimen and clearly indicate the true bond existing between the Meehanite metal and the tin coating, when using the chloride method of tinning.

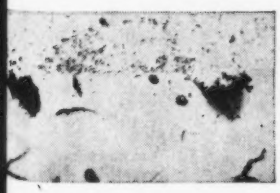
Fig. 2 relates to the use of the nitrate method, which can be outlined as follows: (1) Mechanically clean the surface of the casting, (2) degrease in trichlorethylene or hot alkali, (3) pickle in 10 pct sulfuric acid for 30 sec at 185°F using an inhibitor, (4) rinse and dry, (5) dip in salt bath consisting of equal parts of sodium and potassium nitrate for 15 min at 660° to 750°F; (6) wash in cold water; (7) pickle in 10 pct hydrofluoric acid for 1 min; (8) rinse and immerse in flux solution, and (9) tin as in chloride method.

Again the true bonding between the tin and the Meehanite casting is clearly shown by the photomicrographs representing the various stages of specimen preparation and etching.

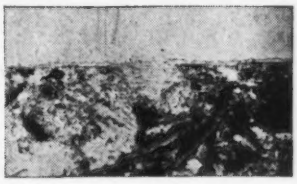
[1] *A discussion of various methods of tinning cast iron, including the chloride and the nitrate methods, was contained in the article "Tinning Cast Iron,"* THE IRON AGE, *Jan. 16, 1947.*



After first grinding. X250.



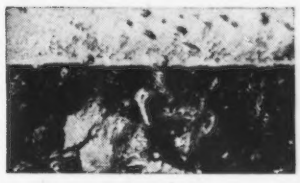
After final polishing. X500.



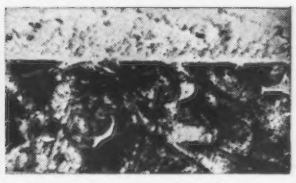
Etching in nitol. X500.

FIG. 1—Typical results obtained in tinning type GE Meehanite by the fused chloride method.

After first grinding. X250.



After final polishing. X500.



Etching in nitol. X500.

FIG. 2—Typical bond obtained in tinning Meehanite by the nitrate method.

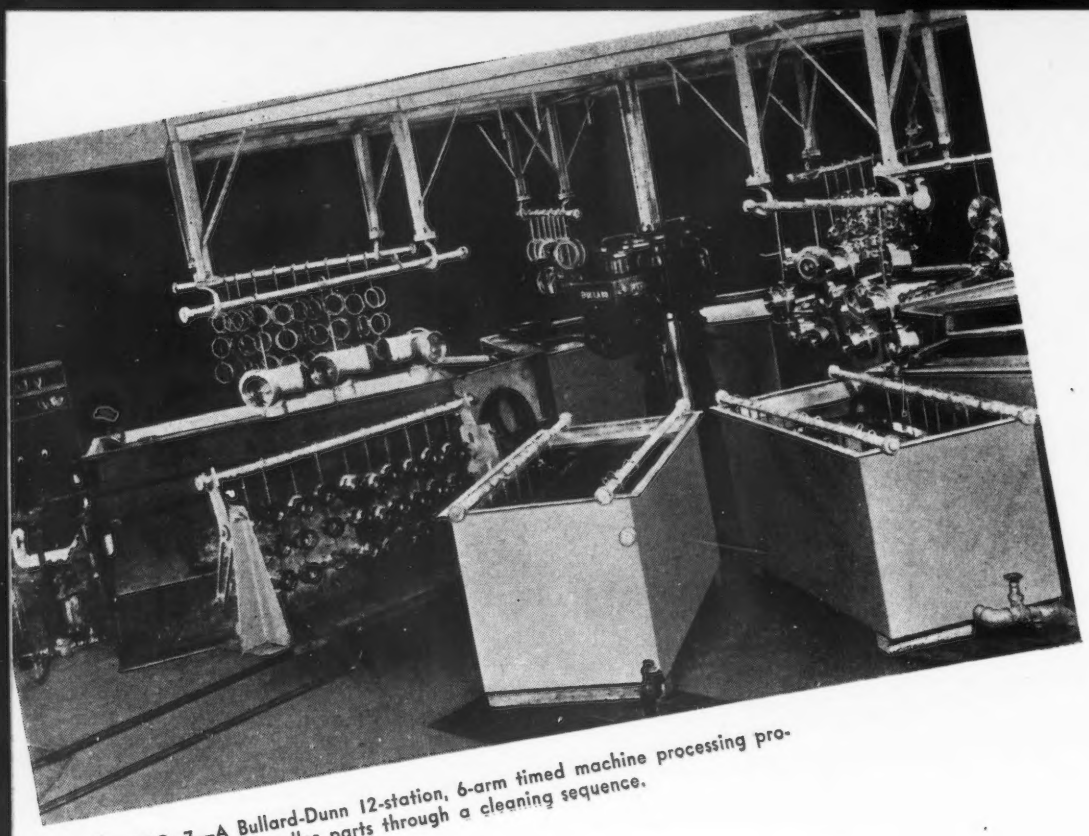


FIG. 7—A Bullard-Dunn 12-station, 6-arm timed machine processing propeller parts through a cleaning sequence.

Automatic Co

o o o

AUTOMATIC plating equipment regardless of the particular type or make, presents a number of distinct advantages over still plating. Considering the technical advantages first, they are:

(1) Automatic plating equipment is a suitable tool for mass production methods because it handles the product continuously, instead of in batches, or discontinuously, as in still or barrel plating.
(2) Greater uniformity of product is obtained due to: Uniform plating load; uniform time intervals for cleaning, rinsing, pickling and plating; movement of work through baths provide agitation, decreases gassing and prevents pitting and burning, and results are independent of variations in the operator's judgment.
(3) As a result of increased uniformity of product: Specifications are met consistently; rejections are low, and production may be scheduled and deliveries met.
(4) Working conditions are improved: Compact arrangement of equipment greatly reduces the distances that operators must walk; health hazards are reduced, as the operators do not have to lean over the tanks to handle the work, and floors are cleaner and better housekeeping exists.

The economic advantages obtained through the use of plating conveyers are:

(1) Increased output rate as the operation is continuous. and higher current densities may be used: The rate of output is greater per square foot of floor space than by hand operation, and the output is greater, per manhour of labor and supervision.
(2) Low rejections save cost of refinishing or loss as scrap.
(3) Reduced health hazards and lower injury rates due to better housekeeping lead to lower compensation insurance costs.
(4) Dragout is reduced. as the transfer may be timed for the optimum balance between dragout and speed. A decrease in dragout represents reduced expenditures for chemicals, anodes and control.

Full automatic plating equipment is applicable to an almost infinite variety of work. Automatics have been used for the electrodeposition of zinc, chromium, nickel, copper, brass, bronze, cadmium, tin, silver and gold. They are at work on airplane wing sections (anodizing); automobile parts and accessories (brake shoe sectors, bumper bars, grilles, head lamps, pistons, radiator shells, reflectors, skid chains, etc.); band instruments; bicycle parts; bottle cappers; business machine parts; conduit pipe; diecastings; electrical appliance parts (coffee pots, toasters, irons, waffle irons, etc.); electrotype plates; hardware; kettles; meter magnets; radio parts; refrigerator parts; safety razor parts; saucepans; sewing machine parts; silverware; stove parts; strip steel; typewriter parts; wire; wire cloth; zipper fasteners; and so on almost indefinitely.

During the war, the demand for precision plating leaped to hitherto undreamed of proportions. War products, from cartridge cases to airplane wings, had to be plated to predetermined thicknesses with close tolerances. This type of work included fuse bodies, propeller parts, aircraft bearings and thousands of parts of mechanisms ranging in size from pins to battleships, and in delicacy of operation, from bulldozers to radar equipment.

In the first part of this two-part article, published in the June 19 issue, the author reviewed the economic background of the development of automatic plating equipment and described the features of major types of equipment now available. A discussion of the application of this equipment was also included.—Ed.

Limitations of Automatic Plating Equipment

The shortcomings of plating conveyers are few but definite. The most obvious is the cost, which precludes their use by the small plating establishment, or the plant with frequent and wide variations in types of work. Although plating conveyers can be employed in many fields, the individual unit is still somewhat lack-

Conveyors for Electroplating . . .

By ADOLPH BREGMAN
Consulting Engineer, New York

Advantages and limitations of automatic electroplating equipment are reviewed in this, the second section of this two-part article. Plating costs with full automatic conveyers are also discussed and detailed descriptions are given of the operating characteristics of a number of automatic conveyers available for plating work.

ing in flexibility. Changes in work will call for changes in schedules, and consequently, revamping or even redesign of the machine. Full consideration must be given to the cost of such changes.

A long step toward overcoming this handicap is the practice of using a full automatic for all pretreatments (cleaning, pickling, rinsing, etc.), then transferring the work to a semiautomatic for plating, and then again transferring to a full automatic for rinsing and drying. This plan permits the use of one full automatic in connection with several semiautomatics; the full automatic performing the identical pre- and post-plating operations, and each semiautomatic applying the specific plate or treatment called for by the different classes of work. This production cycle has been found applicable even in job plating shops.

[1] *Anon. "Gold Plating with Automatic Conveyer System," Metal Industry,* 27, (1929).

Although detailed figures for plating costs with automatic equipment are not generally published, broad estimates may be made, using some of the known cost elements.

Labor—A semiautomatic plating machine may require only one operator. A full automatic of the return type may require from one to four operators, depending upon its size. Straight-line full automatics need at least two men per machine. However, when there are several parallel machines, two operators are often capable of handling two machines. For example, three wire cloth galvanizing machines can be handled by two operators.

In one installation, a full automatic produced 13,000 parts or 6500 complete gold plated items per hour, with a daily output of about 50,000.[1] It was stated that the conveyer could be operated by one bright young man entirely lacking in electroplating experience, with an experienced plater, using only part of his time, to supervise the work. The hand method that was previously employed would have required the services of at least 100 people for the same production rate.

One return-type full automatic machine electrodepositing zinc on steel is tended by two girls for racking, one man for loading and unloading, with some additional labor charges for oiling, maintenance and supervision. The same output, if produced by hand, would require 22 people.

In a stove manufacturing plant, an installation plating copper and nickel automatically was operated only 1½ days per week. The output was adequate under under their schedule, and the operator was kept busy doing a variety of accessory work, including shipping during the balance of the week.

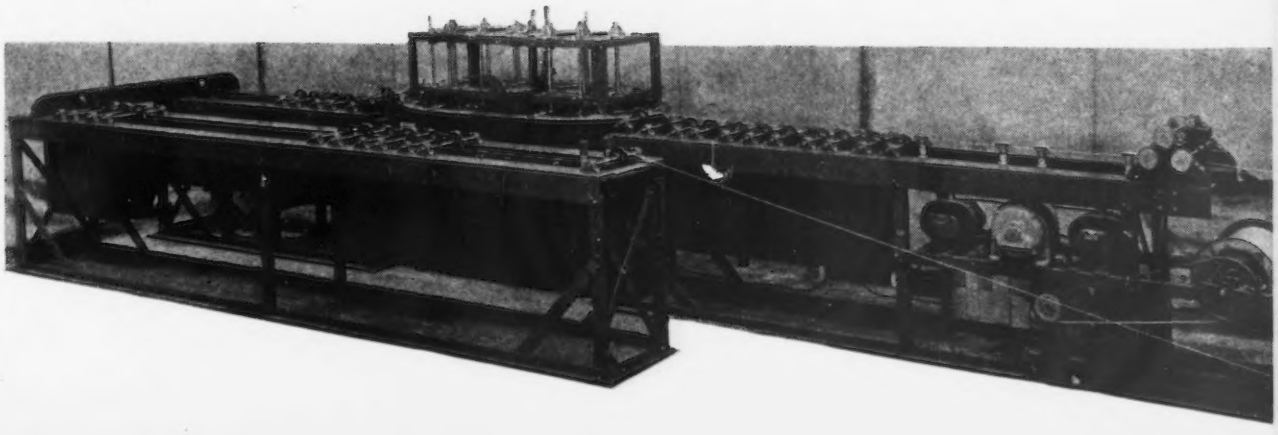
[5] *Anon. "New Automatic Plating and Cleaning Machine," Metal Industry,* 28, (1930).

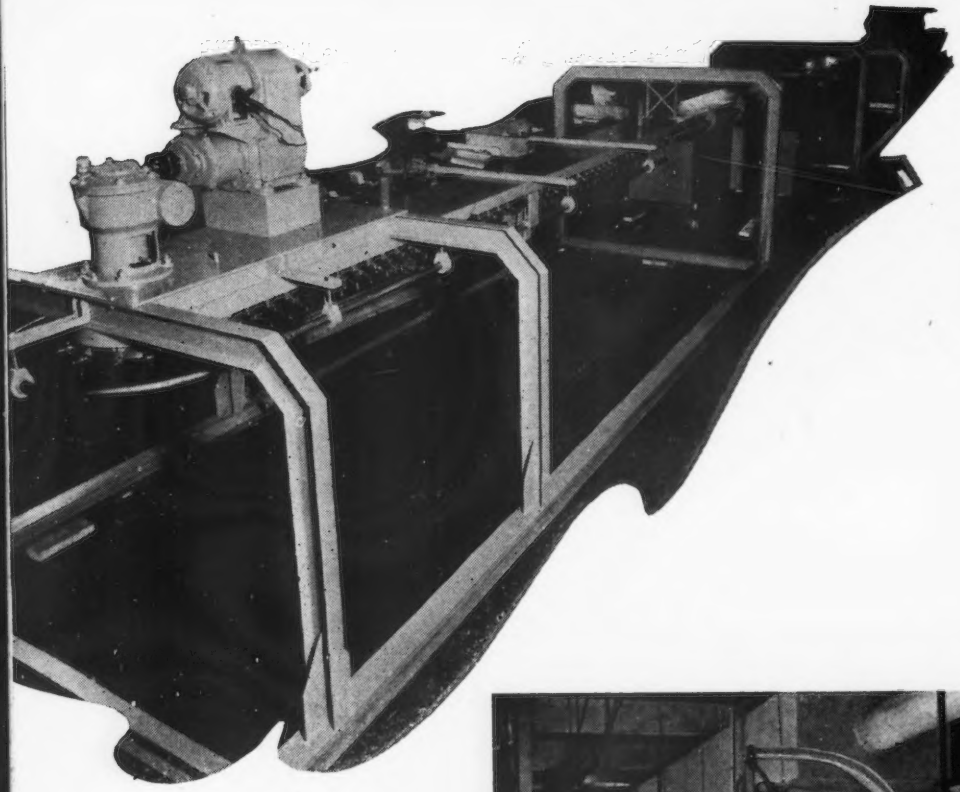
Power—The conveyor and transfer drives have relatively low power requirements. A semiautomatic machine is generally equipped with a ½ to ¾ hp motor. The requirements for driving a large straight-line full automatic may be as low as 5 hp.

Maintenance—Charges for maintenance for automatic plating equipment are low, because the parts are slow moving, and undergo little wear. For example, several automatic machines for electroplating, cleaning, pickling, etc. designed and built by Sargent & Co., New Haven, Conn., operated for nearly 20 years with only minor repairs.[5]

First Cost—The cost of full automatic plating equip-

FIG. 8—Assembly view of a H-VW-M continuous type degreasing, electrocleaning, brass plating and drying line.





ABOVE

FIG. 9—Overall view of framework for Lasalco Daw Junior type full automatic conveyer.

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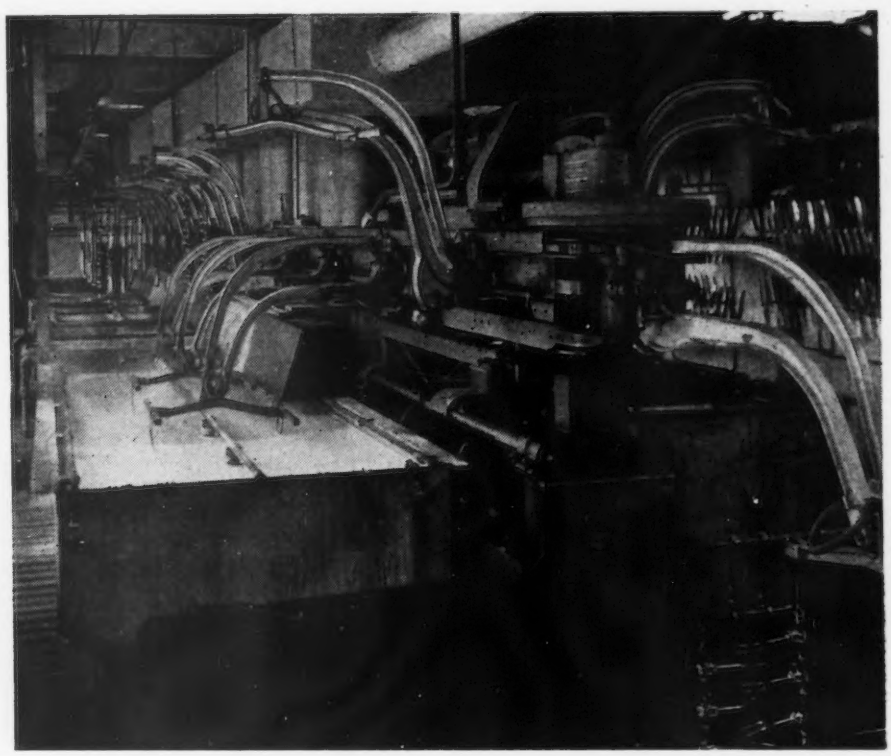
RIGHT

FIG. 10—Stevens model A full automatic side arm plating machine viewed from the loading and unloading end. Carrier arms fan out the return bend to permit easy access for racking and unracking.



ment may range from a minimum of about $8000 to as much as $50,000 plus the cost of installation. Since the machine is in almost every case a custom-built job, no definite figures can be given without a detailed statement of the requirements, conditions, etc. However, in a general way, it may be stated that the first cost of a full automatic plating machine may be kept at a minimum by careful consideration of the following factors:

(1) Cycle of treatments
(2) Racking: Keep area large to reduce lift and require few carriers; crowd work on rack; set work on racks back to back when allowable
(3) Chain speed: Allow for initial loading of conveyer; operating time (one, two or three shifts); production requirements (maximum, average, seasonal and margin), and variable
(4) Anode centers
(5) Current capacities, maximum load in each treatment.
(6) Tanks
(7) Coils
(8) Air agitation
(9) Sprays
(10) Ventilation
(11) Dryer
(12) Washing machine.
(13) Other refinements and extras: Oscillation; delayed set down; duplex electrification; temperature control; filter presses
(14) Type of conveyer: Straight line; return type; elevator; hump or roller coaster; side arm; angle; arm transfer
(15) Available headroom and floor space
(16) Field installation
(17) Number of carriers in loading station

A full automatic may have an operating life as long as 10 to 20 years (under one-shift operation), provided the machine is maintained in good condition, but it is customary to amortize a machine in 2 to 3 years, as at the end of this period the machine may have to be revamped for the manufacture of new products. There is wide latitude in the various methods of revamping. A long machine can be made shorter, or it can be divided into small units. Tanks, conveyers and transfers can be added to increase the size of the unit. Sections can be rearranged to change the sequence of operations.

Available Makes of Full Automatic Machines

Following are brief sketches of full automatic plating conveyers available at this time. The largest pro-

ducers of these conveyers are: Bullard-Dunn Process Div. of Bullard Co., Crown Rheostat & Supply Co., Hanson-Van Winkle-Munning Co., Lasalco, Inc., Meaker Co., Frederic B. Stevens, Inc., Udylite Corp. and U. S. Galvanizing & Plating Equipment Corp. To all of these companies, acknowledgement is made by the author for their help in supplying data on their equipment for use in this article

The Bullard-Dunn Process Div. of Bullard Co. builds a station or umbrella-type conveyer, a hydraulic, rotary machine, made with any number of stations from 5 to 20 inclusive. Operation can be fully automatic or manual, as desired. While the design is basically standard, each machine is engineered to meet specific conditions. This conveyer is useful for loads that are carried through low or high lifts. It is in use for Bullard-Dunn process descaling, Bullard-Dunn process rubber mold cleaning, cleaning and plating, acid dipping, surface treatment of aluminum, hot tinning, soldering, Iridite processing for galvanized coatings, etc.

Optional features include a time delay before indexing to permit longer draining and also a means for providing agitation which is accomplished by having the ram rise a few inches at periodic intervals throughout the dwell period.

These machines may be either single or dual timed. The single-timed machine leaves the work at each station for the same length of time. The dual-timed machine conveys the work through an alternate cycle such as 2 min at the first station, 0.5 min at the second, 2 min at the third, and so forth—a useful system for such operations as cleaning prior to plating where the rinse steps are preferably shorter than the others. The dual timing is accomplished by having half as many arms as stations, alternately placed, and by using a double-timing unit.

A barrel attachment is available for handling small parts. The barrel and driving mechanism are so designed that the barrel unit can be placed on a work rod and used continuously, or it can be removed as desired, thus freeing the arm for racked work. Rotation of the barrel is effected by means of a motor mounted either on the barrel unit itself or on an arm of the machine. Current for the barrel drive comes through a collector ring mounted on top of the ram head. Fig. 7 illustrates a 12 station Bullard-Dunn unit.

The Unit-Matic equipment made by the Crown Rheostat & Supply Co. consists basically of two types of synchronized units which are either air or hydraulically operated. These are (1) fully automatic travel-transfer units, and (2) partially automatic variable speed conveyer tanks of either straight-a-way or return type.

The equipment is designed to be set up as a plant of independently operating units so synchronized or coordinated as to give fully automatic performance, partially automatic performance, or combination, fully and partially automatic performance.

The two basic types of Unit-Matic equipment units fall into four general plating plant arrangements, as follows:

(1) Fully automatic: Where two or more fully automatic and/or partially automatic units are electrically connected in series and operate as a fully automatic synchronized unit. These include the straight-a-way and return types.

(2) Fully automatic: A single travel-transfer unit operated as a fully automatic machine on a short cycle and a short-timed series of operations. These include the straight-a-way and return types.

(3) Partially automatic: Tanks with two types of variable speed conveyers. One is the straight-a-way type, which travels work from end to end and requires two operators, one at each end to load and unload the machine and the return type, which is loaded and unloaded at the same station by one operator.

(4) Combination fully and partially automatic: A combination, each unit of which is mechanically independent of any other unit. By interposing a manual transfer between the fully automatic and the partially automatic units, the plating department can be coordi-

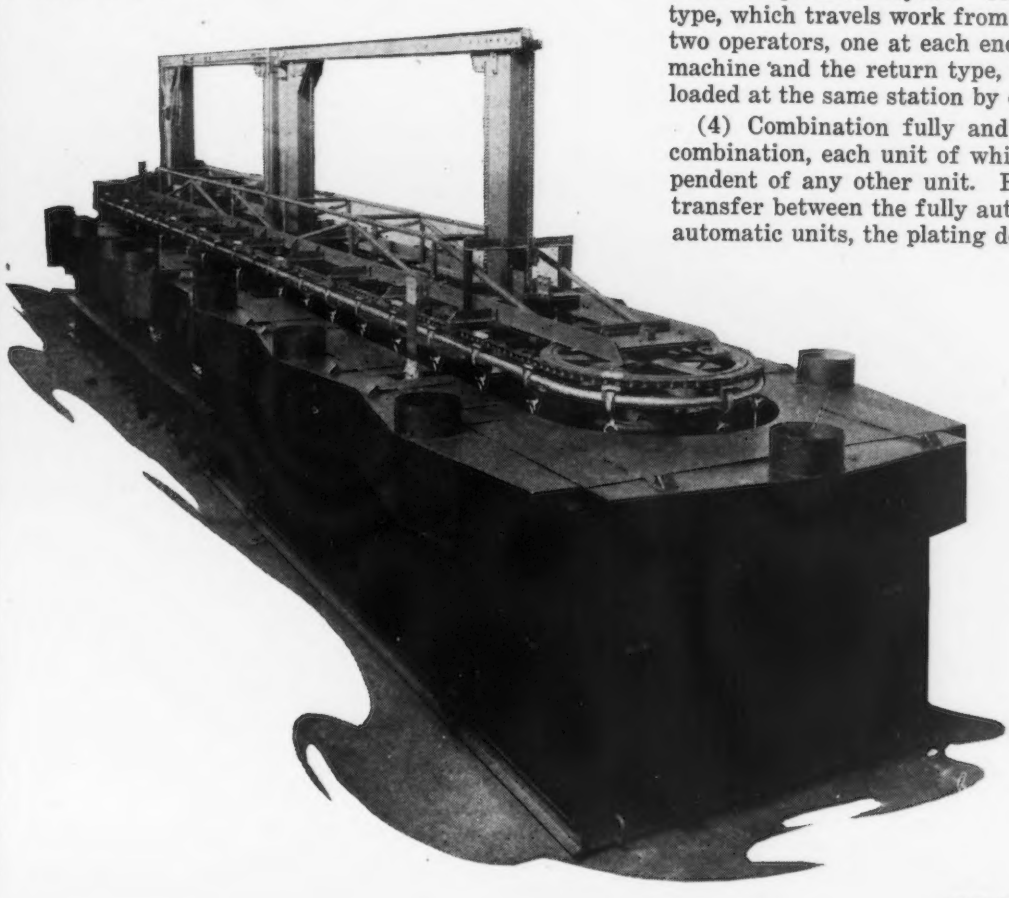


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FIG. 11—A full automatic plating conveyer manufactured by Udylite.

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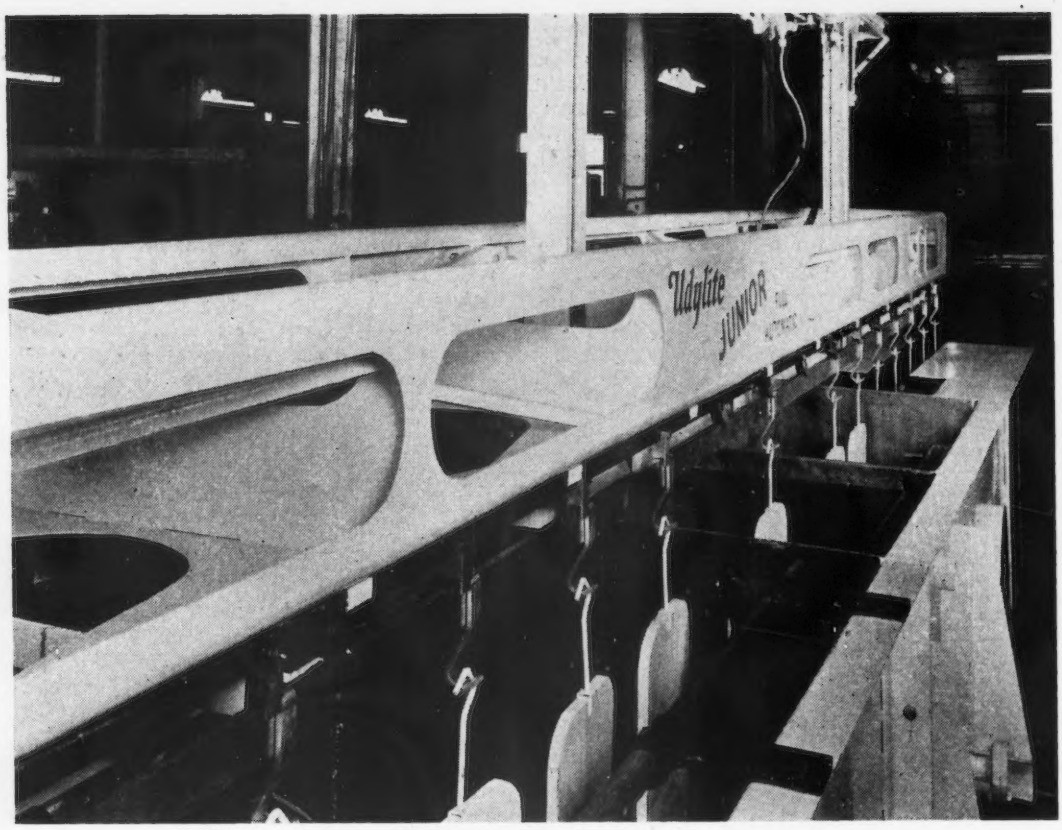

FIG. 12—The newest Udylite unit, a Junior full automatic designed especially for cyanide baths.

nated into a mechanized processing unit that closely approximates a fully automatic layout. This provides flexibility, permitting quick change to meet any sudden changes of plating specifications, for a wide variety of plating where only moderate production is required. Fig. 2 (Part I, June 19 issue) shows a Crown straight-a-way type unit in operation.

The Hanson-Van Winkle-Munning Co. offers a full line of conveyers including the elevator type, the Munning (return) type, the straight-line (or straight-away) type, the Hall type (a special heavy-duty machine), and a variety of special machines such as caustic cleaning lines for steel mills, the strip tin plating line, wire and cable plating machines, machine for plating zippers (slide fastener chain already assembled to the tape), etc.

The Munning type, one of the most widely used machines at the present time, features wide cam permitting larger barriers at transfer points; continuous chain motion providing constant agitation; price low for long machine with few transfers; narrowest floor space; ceiling mounting; no parts under excessive strain; low power requirements; and double row carriers with proportionately greater production capacity.

The elevator-type machine is designed to meet the following basic conditions:

(1) High lifts and deep tanks for low ceiling plating rooms. (It will function equally well with low lifts and shallow tanks.)

(2) Massive parts involving wide carrier spacing. (Present installations operate from 18 to 84 in. centers between carriers.)

(3) A rigid carrier arm to which rigid fixtures may be attached. Rotating baskets are removed from rotating fixtures at unloading station, trays from rigid shelf brackets, heavy castings from rigid containers, etc.

(4) Heavy work loads and heavy current loads. (Existing machines run from 10 lb loads per carrier to 225 lb. Current ranges from 10 amps per carrier to 3000 amps.)

(5) A fixed, predetermined transfer time, suited for the particular job, that will not vary with changes in rate of production.

(6) Simplified means of ventilation and accessibility of all mechanism at floor level.

(7) Minimum overall length with vertical lift at transfer points.

(8) A balanced counterweighted design that functions properly under all load conditions with low power requirements.

(9) Double row carriers with proportionately greater production capacity.

The elevator carrier moves intermittently. The roller skate to which the carrier arm is attached, slides freely in the two steel channel guides. These guides are mounted in attachments secured to the upper and lower chains. A steel roller on the back section of the roller skate engages a fixed track or flipper of the elevator mechanism during the vertical travel up or down. When in the up position, the two horizontal chains move all carriers forward, a distance equal to the selected carrier spacing.

The elevator mechanism is mounted in bearings on vertical shafts, and lifted by crank arms from gear reducers spaced on equal centers. Counterweights offset gross lifting load. All reducers operate from one shaft and one drive. The forward travel is independent, consisting of motor drive, brake, gear reducer, etc., mounted in a box at one end, with take-up devices at opposite end of conveyer.

Where two or more carriers are assigned to a treatment tank, flipper plates index the carrier to remain down or to be raised by the elevator.

The other machines are for special purposes, designed for specific products. This type of work is one of the outstanding services offered by this company.

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FIG. 13—Automatic installation for tin-plating inside of kettles. In this U. S. Galvanizing installation, the kettles themselves serve as the plating tanks.

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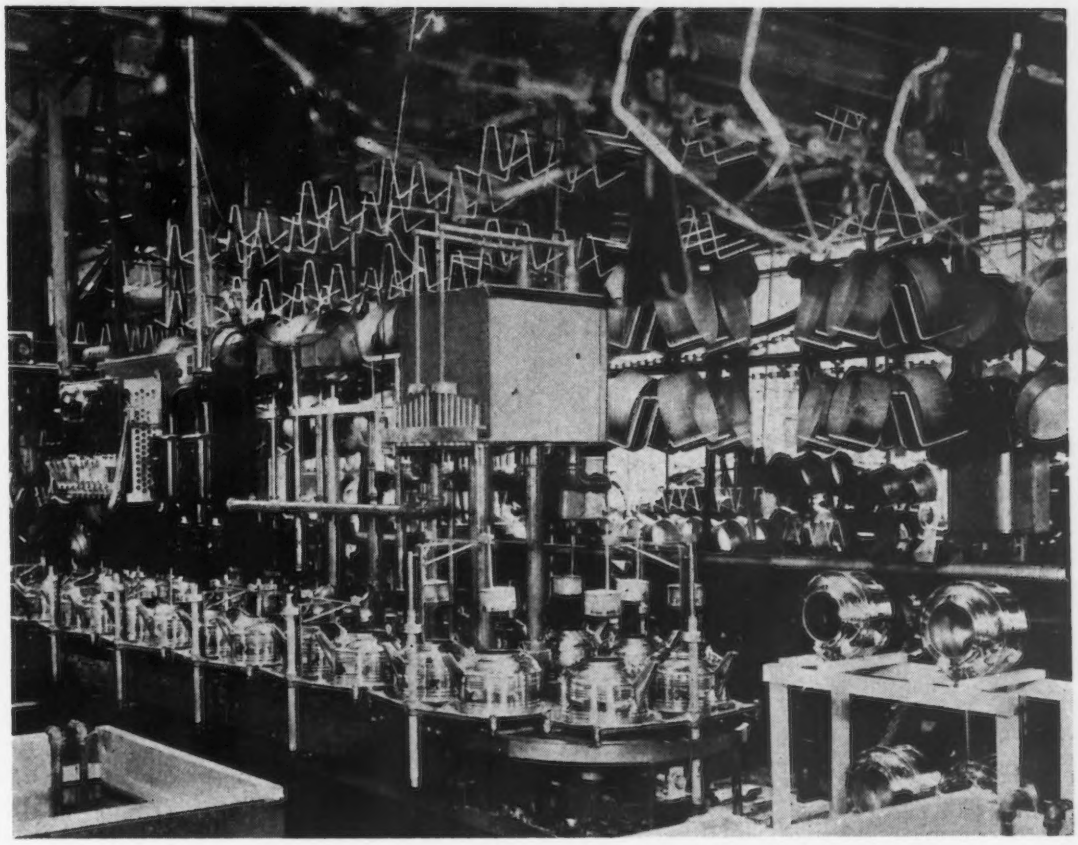


Figs. 1 and 3 illustrate H-VW-M elevator type conveyers, and fig. 4 shows a Munning type installation. Fig. 8 is an assembly view of a continuous type degreasing, electrocleaning, brass plating and drying line for 7/19 cable.

Lasalco, Inc. features the 30° angle type conveyer, the Dow Junior type full automatic (a smaller sized machine) and the Daw Senior full automatic and the Quick Transfer full automatic. Fig. 5 illustrates a Lasalco 30° angle type full automatic unit, while fig. 9 is an overall view of a Daw Junior full automatic conveyer.

The Meaker Co. builds a straight-a-way full automatic, a return-type full automatic and special processing conveyers. In the straight-a-way machine, the transfer mechanism consists of two loops of roller chains operating in a vertical plane over four sprockets, one loop at each side of the machine. Each loop is provided with a cup attachment which engages the ends of the carrier rod, raising it vertically out of one tank, advancing it across the end and setting it down in the succeeding tank. With this roller chain transfer, which operates independently of the conveyer, it is possible to provide fast or slow, wide or narrow transfer, all on the same machine but all perfectly synchronized with the main conveyer. Thus a dip with the minimum of time intervening between it and the next rinse may be provided or a slow transfer permitting draining or dripping may be just as easily incorporated.

This type of transfer also eliminates the necessity for critical timing, with its attendant possibility of disrupting the mechanical operation. In synchronizing the conveyer chain with the transfer, only the point of pick-up need be considered. If the set-down is an inch or two ahead of the pusher attachment, this will not interfere with the progressive operation of the machine.

The Meaker return-type full automatic generally consists of two parallel rows of tanks underneath the horizontal loop conveyer. The rack carrier is a vertical member, the top section of which slides along a channel enclosing the main conveyer chain and is propelled forward by pusher pins spaced along the main conveyer.

Transfer is accomplished independently of the main conveyer chain, yet synchronized with it, and transfers of proper speed can, therefore, be provided regardless of the speed of the main chain. This is an important factor in the elimination of drying and oxidation between operations, and thus insuring a satisfactory finish.

In this transfer mechanism only one chain loop is used. A lifting knob rigidly engages the top member of the rack carrier and prevents it from swinging. The transfer elevates the rack carrier, advances it across the tank end and sets it down into the succeeding treatment tank. Fig. 6 (Part I) shows a Meaker return-type machine.

Frederic B. Stevens, Inc. developed and specializes in the side-arm return-type full automatic plating machine, which they produce in several models. Model A, illustrated in fig. 10, embodies the use of the auxiliary cam shaft and lifters as the means of rapid and constant transfer as well as to reduce the overall length of the machine to a minimum.

The plating racks can be loaded on the carrier arms at either end or at any point between the ends on either side of the machine. Machines can be operated clockwise or counterclockwise as specified. A special delayed set-down can be built which provides independent timing in one or more tanks and is still entirely

independent of the other operations. This mechanism can make the carrier arm skip any particular tank or operation if desired. Bipolar arms may be provided, if desired, for chromium plating large parts like grilles.

Electrical control of plating time is provided so that variable plating time is possible without varying the transfer time. The plating time is varied by an automatic electrical time clock by which the plating time can be instantly changed to meet varied plating conditions, while the transfer time remains constant.

The Model B machine is similar to the Model A with the exception that the auxiliary cam transfer mechanism is omitted. The transfer is obtained by means of a stationary cam which is rigidly attached to the roller track on the machine so as to cause the carrier arms to ride up one side of the cam casting across the flat section of the cam, and lower down into the succeeding processing tank.

In Model C the material to be processed is loaded into perforated plating baskets by one operator. Then the material is automatically conveyed through the complete processing cycle, and is automatically unloaded. The plating baskets move in a vertical position at the loading end of the machine.

After loading, the plating basket arm assembly—which is attached to the conveyer chain—travels over the stationary hump-type cam, to the first processing tank. As the plating basket is lowered into each treatment tank, the bronze worm, located on the spindle assembly between the plating basket and the chain bracket, meshes with the longitudinal steel worm and revolves the plating basket continuously, except during the transfer from one processing tank to another.

The Udylite Corp. builds a full automatic plating machine designed for economy in space, first cost and operating cost. The steel supporting frame and superstructure are electrically arcwelded. Counterbalancing is provided so that the transfer mechanism carries only the weight of parts being transferred. Anodes are easily replaced without stopping machine or disturbing work. The drive mechanisms is adjustable for various chain speeds and gears for smooth starts and stops.

A single row carrier system avoids crowding and burning the work on turns. The machine is capable of handling 76 to 125 racks per hr.

A single hydraulic mechanism lifts the racked work straight up from the tank, transfers and lowers the work straight down into next station, thus saving 18 to 24 in. of tank length per transfer. The lift, transfer and lowering speeds are independently variable. Rack spacing may be adjusted to suit the size of racks used. Additional carriers and drives may be inserted in the chain without any readjustment of the transfer mechanism. Fig. 11 is a Udylite full automatic plating conveyer.

This company also makes a rotary (umbrella) type machine suitable for a full process cycle, including electrocleaning, rinsing, acid dipping, plating and drying. Transfer time may be varied by hydraulic control valves and dwell time may also be varied from 2 sec to 20 min by adjustment of an interval timer.

The machine is supported independently of the tanks. The transfer mechanism, rotating cam, and hydraulic cylinder are mounted on a common base forming a compact unit. The web superstructure is mounted on the piston rod of the hydraulic cylinder.

The transfer unit consists of a single hydraulic cylinder that supplies power for both the lift and rotating movements.

The Udylite Corp. has also developed a new Junior type fully automatic plating conveyer, shown in fig. 12, designed especially for cyanide plating baths. This conveyer is made to the following specifications:

The floor space required is approximately 27 ft x 6 in. long x 6 ft 3 in. wide (8 ft x 6 in. wide across the dryer tank) with a ceiling height of 8 ft 6 in. The conveyer includes tanks for cathodic cleaning, cold rinse, acid dip; cold rinse, electroplate; cold rinse, hot rinse, drying, and a loading and unloading space.

The transfer time may be varied by means of flow control valves, but the recommended time is 26 sec. The transfer unit consists of a single air cylinder that supplies power for the lift. It will give a clear lift of 30 in. over the tanks. The driving mechanism consists of a single air cylinder with an 18 in. stroke moving the work carriers on 16 in. centers.

U. S. Galvanizing & Plating Equipment Corp. builds full automatic plating machines of the straight-a-way and return type. Their installations have included machines for plating household electrical accessories, kettles, meter magnets, automobile accessories, steel tubes, etc. They installed a completely automatic plant for Steel & Tubes, Inc., a subsidiary of Republic Steel Corp., at Brooklyn, N. Y., which cleans, plates, enamels and bakes conduit pipe in 17 operations.[6] This machine is 207 ft long by 15 ft wide and has a capacity of 10 lengths or 100 ft of conduit pipe per minute, fully galvanized by electrodeposition of zinc on the outside, and having a baked enamel coating on the inside. This entire installation is driven by a single motor of only 5 hp. A U.S.G. installation for tinplating kettle insides is shown in fig. 13.

[6] *Anon. "Automatic Zinc Plating and Enameling Pipe," Metal Industry, 29, (1931).*

Electric Creaser Bends Plastic Sheets

PROVIDING thermostatically controlled instant crease action that not only accelerates creasing or folding of cellulose acetate, ethyl cellulose and other thermoplastic sheeting but also produces more effective creases or folds with repetitive uniformity, the Thermocreaser is announced as a newly perfected development by the Plastic Equipment Div., Taber Instrument Corp., North Tonawanda, N. Y.

This unit is said to produce a right-angle crease or fold on plastic sheet up to 30 in. in width at hourly rates exceeding those generally attainable for this operation under average production conditions. It is intended for use in making square set-up boxes and other type transparent packages, plastic novelty goods and related items which require right-angle creasing or folding.

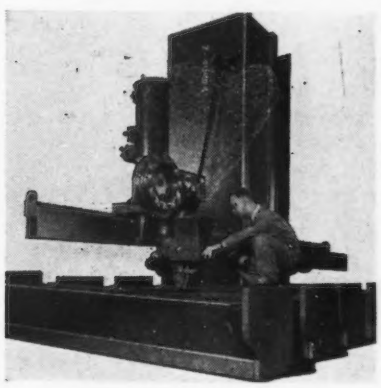
The new unit enables high-speed creasing or folding to be performed with equal facility on either a metal die or a rubber pad instead of only rubber as commonly used heretofore.

New Equipment . . .

Recent models of seam welders, a draw cut shaper, metal-cutting band saw, gear checker, gas purifier, time cycle controller, diaphragm air motors, and a multiple oiler are reviewed in this week's issue. Also featured are a hydraulic power unit, metal tag embosser, scrap cutter, air powered vise and a dust control unit.

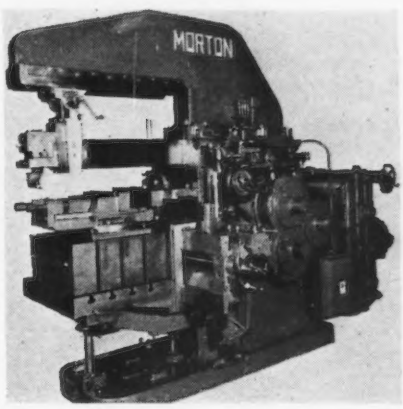
Electronic Welding Machine

ANNOUNCED as providing faster welding with less passes per seam, an electronic automatic welding machine has been manufactured by *Niagara Machine & Tool Works,* 683 Northland Ave., Buffalo. Electronic control provides variable speed of the machine along a track so that the length of welding is governed only by the track length. Welds perpendicular to the track are accomplished by traveling the welding head at a variable speed along the cantilever beam. Finger-tip, push-button control brings the power elevated beam to any height position in changing setups. Flexibility and simplicity of operation make this a one man machine since all welding adjustments and machine movements are controlled from one centralized station.



Draw Cut Shaper

THE Morton 32-in. stroke high duty draw cut shaper has been announced by the *Morton Mfg. Co.,* Muskegon Heights, Mich. It is designed with overhead ram support and special heavy duty shaper head and built for light or heavy duty shaping and planing. The shaper has 32 in. of cutting stroke, 32 in. of horizontal or side feed, 16 in. of vertical feed and a distance from the ram to the table when lowered of 30 in. A rectangular hollow bored forged steel ram is said to provide ample strength for deep cuts with coarse feeds. Two elevating screws provide alignment of table and work. Rapid power traverse and automatic feeds for both horizontal and vertical movement are provided. The unit is powered with either a 7½ hp ac or dc multi-speed motor or a 10 hp constant speed motor and control with variable speed transmission. Shaping to layout lines is done on the outside of the work in view of the operator and chips are removed toward the machine column.



Locating Microscope

DESIGNED for use in the Moore jig borer or jig grinder, a locating microscope which reverts the image to upright and picks up edges, contours, irregular shapes, and holes too small for an edge finder or indicator has been developed by the *Moore Special Tool Co., Inc.,* Bridgeport, Conn. An optically engineered precise roof prism in the microscope enables the operator to see the work in the same position as without it. In addition to a double pair of cross lines, spaced 0.001 in. apart, the reticle contains a large number of conveniently spaced concentric circles whose lines are broken to facilitate locating small holes or large radii otherwise covered by the line. The microscope provides a field of vision wide enough to include a large portion of the workpiece, a full ¼ in., simplifying the picking up of a reference point. With a suitable shank or adapter, the locating microscope may be attached to any machine or inspection tool requiring an optical pickup device.

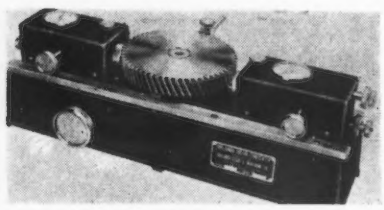
Fatigue Testing Machine

AFFORDING flexure fatigue tests on sheet stock of any material, metal, plastic and wood, and said to require no attention during the test, a bench type fatigue testing machine with constant-force loading feature has been offered by *Baldwin Locomotive Works,* Philadelphia 42. This Sonntag model SF-2 uses a revolving eccentric mass as a means of loading the specimen, avoiding cams or eccentric connecting rods. The load automatically remains constant regardless of the changes in the amount of deflection of the specimen, it is said. A predetermined load is alternately applied to the specimen, and the resulting deflection is incidental. Because of its comparatively small size, 15 x 12 x 32 in., the fatigue testing machine can be placed in a cabinet

during a test so that temperature and humidity can be controlled. The machine weighs 115 lb, has an alternating force capacity of 20 lb and a speed of 1800 cycles per min with a total travel of the loading yoke of 1 in. per cycle.

Gear Checker

RAPID, accurate high production checking of spur and helical gears with pins and balls can be performed, it is reported, with a gear checking machine manufactured by *Orlandi Gear & Machine Co.*, 16203 Meyers Rd., Detroit 27. Visual checking of pitch diameter, concentricity, size, tooth spacing, backlash and parallelism can be performed as fast as gears can be placed on the locating pin. Large and minute spur, helical and worm



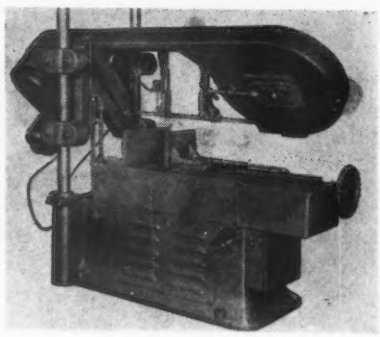
gears, plain and cluster, can be checked with accuracy even by inexperienced persons it is claimed. The machine can be converted for rapid three wire checking of any thread form or for use as a comparator in checking precision parts.

Grinder Spindle

A MOTORIZED spindle introduced by *Pope Machinery Corp.*, 261 River St., Haverhill, Mass., features sealed-in lubrication and an enclosed, fan-cooled motor. Bearing capacity and rigidity have been designed to allow roughing off surplus metal rapidly. The spindle may be equipped with a fine flange spindle nose for mounting grinding wheels or other tools. It is available in 3, 5 and 10 hp; 1200, 1800 and 3600 rpm. Units with other horsepower and speeds are available on special order.

Metal-Cutting Band Saw

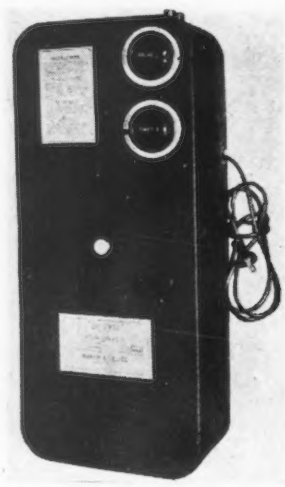
FEATURING an automatic cutting cycle in which the blade is fed into the work at a constant pressure and the cutting head is returned by hydraulic power to its starting position above the work upon completion of the cut, a heavy duty horizontal metal-cutting band saw, the No. 12, has been manufactured by *Wells Mfg. Corp.*, Three Rivers, Mich. The saw has been designed for cutting off rectangular stock up to 12 in. deep x 16 in. wide



or cylindrical stock up to 12¾ in. diam. The saw can be automatically controlled to cut to any desired depth for work on dies or other parts. Cutting speeds are 50, 90, or 150 fpm. A ¾ hp motor drives the blade and a 1/3 hp motor drives the hydraulic pump.

Gas Purifier

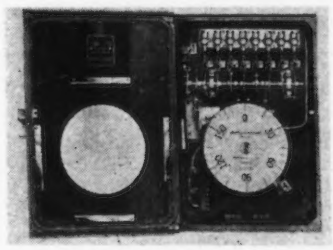
AN automatic device which removes oxygen impurities and eliminates moisture from gases has been introduced by *Baker & Co., Inc.*, Newark 5, N. J. Known as the Deoxo Puridryer, the instrument is said to purify gases such as hydrogen so that less than one part in a million of oxygen impurities



remains, and then dries the gas to a dew point of better than −50°F. It may also be used with gases such as nitrogen, argon, neon and saturated hydrocarbons and is installed at any convenient point on the low pressure line. The unit is designed for up to 5-lb gage pressure and capacity depends upon the moisture content as well as impurity of the incoming gas, which varies with each installation. The catalyst used in purification does not require reactivation unless poisoned by sulphur compounds, carbon monoxide, or organic solvent vapors. The unit is designed for atmosphere furnace application and is also recommended for powder metallurgy, brazing, heat treatment and other applications.

Time Cycle Controller

MODEL C500 impulse-sequence cycle controller, a multiple cam type controller developed by the *Bristol Co.*, Waterbury 91, Conn., is designed for timing a



number of mechanical operations in industrial processes according to a fixed program. Time measurement and pilot valve operation are controlled by separate mechanisms and timing is accomplished by a Telechron-driven aluminum disk on which is printed a 25-in. time scale. Notches are cut on the time scale for the desired schedule of operations and when changes in cycles or schedules are necessary, new disks may be made. Time impulses are transmitted electrically. Controllers are drilled for eight cams and pilot valves, with cams individually adjustable.

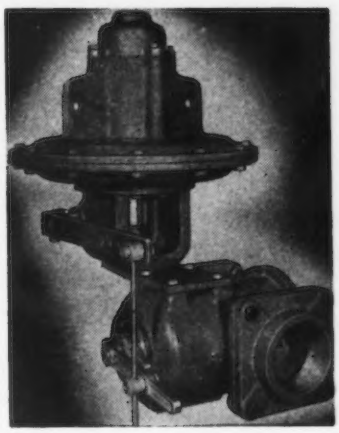
Aluminum Cleaner

OPTIMUS No. 101A, a metal cleaning compound for aluminum, has been developed by *Optimus Detergents Co.*, 92 Water St., Matawan, N. J. This cleaner is described as a balanced blend of medium duty alkaline cleaner, including special water softening materials and inhibitors to prevent attack on metal and it is said to be particularly effective for cleaning

dirt, grease and oil. It can also be used as a soak cleaner for ferrous metals such as diecastings, brass, bronze, pewter, etc., and for this application, the work is made the cathode and cleaned electrically. The cleaner, a mild, non-etching type, may be used in small concentrations, with temperature ranging between 140 and 180°F.

Diaphragm Air Motor

DESIGNED for use with North American adjustable port valves, the Series 600 diaphragm air motor, announced by the *North American Mfg. Co.*, Cleveland, features adaptability necessary for straight-line flow control, but can be used wherever the need for pneumatic control might arise. Pneumatic controller air pressures of 0 to 15 psi are said to afford an impulse pressure range of 3 to 13 psi to the diaphragm motor which results in full 26° travel of the motor arm and develops 25-in-lb



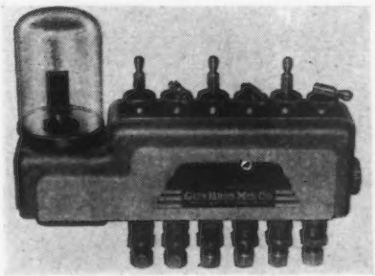
torque for 1-lb change in impulse pressure. Provisions have been made on the diaphragm motor for a valve positioner to obtain the maximum in valve response accuracy.

Stop-Off Compound

KOTE-MASQ, a stop-off lacquer developed by *Hanson-Van Winkle-Munning Co.*, Matawan, N. J., is described by the manufacturer as containing the latest synthetics now available to industry and providing positive adhesion at the edges. It is recommended for use in any electroplating, electrocleaning or anodyzing solution. Kote-Masq consists of three separate materials: The stop-off compound, a thinner for diluting the compound when it thickens and a thinner for diluting when the material is to be sprayed. The compound can be removed with a chlorinated solvent liquid or in a vapor degreaser.

Multiple Oiling System

DEVELOPED to meet the demand for a central point for oiling multiple remote bearings, a multiple oiler has been marketed by



Gits Bros. Mfg. Co., 1846 S. Kilbourn Ave., Chicago. It is a centralized unit with a transparent plastic reservoir and nonspill valve, said to simplify refilling. Copper tubes lead to remote oiling points from a main reservoir. Oil in the main reservoir is maintained at an even level to insure an ample supply at each bearing and is fed from the plastic constant level reservoir. The design also prevents flooding and incorporates a series of valves, one for each lead, which permits the flow to each valve to be adjusted individually and turned completely off or on.

Copper Welding Rod

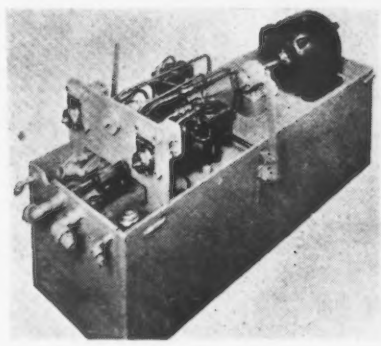
ANNOUNCEMENT of the Airco No. 23A welding rod which is of a silicon-copper analysis has been made by *Air Reduction Sales Co.*, 60 East 42nd St., New York 17. The new rod is said to have superior flowing characteristics, produce strong welds, and provide an excellent color match on copper. The rod is available in ¼, 3/16 and ⅛ in. diam.

General Purpose Electrodes

PRODUCTION of two electrodes known as Agile Brown and Agile-Red-White have been announced by *American Agile Corp.*, 5808 Hough Ave., Cleveland 3. The former have been designed for the all position welding of thin gage steels with dc (straight polarity) or with ac currents. Said to have a high melting rate and a low spatter loss, these electrodes feature ease of operation, soft arc action, minimum penetration and good weld appearance of the weld deposit. Agile-Red-White electrodes were designed for all position welding of mild steel at highest speeds and are classed as improved general purpose welding electrodes. They operate on dc (straight polarity) or ac and can be applied at highest current settings, resulting, it is said, in a fast rate of weld deposit without under cutting and with a minimum of spatter loss.

Hydraulic Power Unit

BUILT for activating any hydraulically driven machinery, a hydraulic power unit has been announced by the *Hufford Machine Works*, Redondo Beach, Calif. The unit is selfcontained with motor,



pump, valves and flow controls mounted above the hydraulic fluid reservoir and filter system. Selector valves enable both forward and reverse motion of the machine to which the power unit is applied and the meter flow controls permit varied speed of the driven mechanism. The unit is suitable for both manual and automatic operations, available in sizes from 1 to 50 hp.

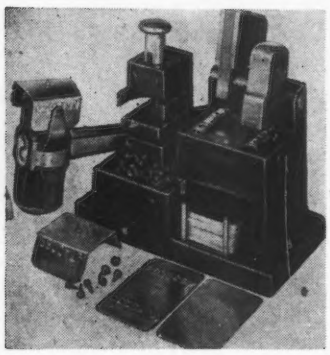
Numbering Machine

A HEAVY duty numbering machine with a one-piece alloy tool steel frame and solid numbering wheels has been designed by *Acromark Co.*, 341 Morrell St., Elizabeth, N. J. Size of the shaft, which is set flush with the holder and locked with a countersunk head

screw, varies with the size of the numbers and the number of wheels. Locking of each wheel is accomplished by a solid lock that sets into a depression between the characters, or the locking fixture may be constructed of separate locks for each wheel. The unit is said to be suited for use in steel mills for numbering rods, bars, billets, and in foundries for numbering castings, or for general field use.

Metal Tag Embossing Unit

A METAL tagging and tag embossing outfit, designed to provide a permanent method of identifying billets during storage in yards, prior to rolling, has been developed by *M. E. Cunningham Co.*, 101 Carson St., Pittsburgh 19. Interchangeable embossing type can be quickly set up in the em-



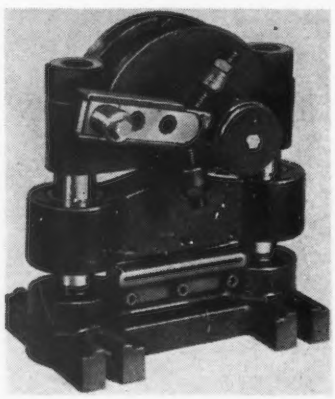
bossing unit. After embossing with a light hammer blow, the tag is placed in a fixture which bends it to fit over the hammer face and into the hammer clamps, at the same time punching a heat-treated nail through the tag. The nail is then driven into the billet.

Dust Control Unit

ANNOUNCEMENT of a portable selfcontained dust control unit has been made by *Kirk & Blum Mfg. Co.*, 2901 Spring Grove Ave., Cincinnati 25. This unit can be set up anywhere to serve any machine for as brief or as long a period of time as needed and will handle grinding, buffing and polishing dirt from metal working machines and all similar dust sources. The unit features an air volume of 900 cfm at 2 in. suction, capacity for four 3-in., two 4-in. or one 6-in. pipe connections; and a 4-cu ft storage compartment, in addition to being semiautomatic in its cleaning operation. The unit has been designed to handle the dust problem in plants having isolated departments or machines where the central station type system is not applicable or practical.

Scrap Cutter

DESIGNED for use on punch presses, a ram-driven scrap cutter said to cut all stock to 4 in.



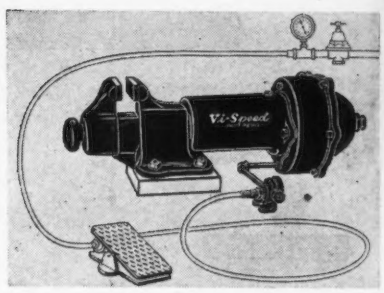
width and 3/32 in. thickness, has been developed by *Haller Machine & Mfg. Co., Inc.*, 7940 Tireman Ave., Detroit 4. Known as the Model D-611, the cutter is mounted on the bolster plate of the press, is driven directly from the ram or die, and is adjustable for any length of ram stroke up to 6 in. High-speed steel blades may be removed for sharpening and are replaceable. The unit measures 6½ in. wide x 9¼ in. deep x 10 in. high.

Wire Rope Lubricant

KNOWN as Klingfast, Leadolene wire rope lubricant has been announced by *Brooks Oil Co.*, Pittsburgh 19. Available in colors, it will serve to identify as well as protect wire products. The lubricant possesses the Indestructible pH-ilm which is characteristic of the company's Leadolene lubricants, and also has such properties as resistance to abrasion and corrosion, a high affinity for steel and other metals, which develops maximum adhesion, prevents drippage, and is said to maintain permanent flexibility, and a high resistance to water, lubricating oils and greases, scale, dusts, and other prevalent forms of contamination. It is said to have excellent resistance to deterioration or malfunction caused by temperature extremes, withstanding temperatures as low as 40°F, as well as unusually high temperatures.

Air-Powered Vise

AN air-powered vise which is said to hold at any selected pressure up to 7000 lb has been marketed by *Van Products Co.*, Erie, Pa. In addition to holding, the vise is said to crimp, bend, drive, bead, form, and rivet. Foot-pedal action applies and releases pressure. Two or more of these vises, known as Vi-Speeds, may be mounted vertically or horizontally to hold long pieces and operated simultaneously from one foot pedal. Each pair of jaws may be preset to meet varying thicknesses of the piece. Application is said to range



from small production pieces to large unwieldy castings. Length with jaws closed is 29 in. and width and height are both 10 in. Weight is 125 lb including controls.

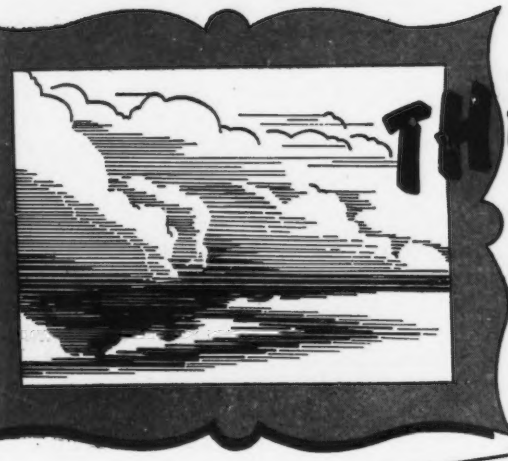
Brake Drums

DESIGNED to contribute greater safety and economy to the operation of heavy duty equipment, a new type of brake drum, announced by *Copperweld Steel Co.*, Glassport, Pa., has a friction surface of special wear-resisting alloy steel and an outside layer of copper with specially designed copper fins. Because of the high thermal conductivity of the copper, the brake drum dissipates friction-generated heat to the atmosphere at a rapid rate, it is said, at the same time helping to maintain a more uniform temperature level over the entire brake drum surface. Advantages claimed for the drum are lower temperature resulting in virtually no heat checking, no cracking, measurably less wear on blocks and drums, and freedom from distortion, together with reduced temperatures on brake parts, tire beads, lubricants and running gear.

WHEN *YOU'RE FIGURING FUEL-COST-PER-TON — FINISHED, INSPECTED AND SHIPPED*

YOU CAN'T AFFORD DOWN-TIME FOR POT REPAIR OR REPLACEMENT

YOU WANT THE WORK AND THE PROCESS (NOT THE FIRING) TO FIX THE POT SHAPE



THEN the logic of KEMP tin and lead melting shows up

FUEL costs, for melting, as in tinning, patenting or dip-heat-treating, are no small factor in the ultimate cost-per-ton of product. Therefore, the opportunity to cut them 30 to 40% by more efficient firing is something to think about.

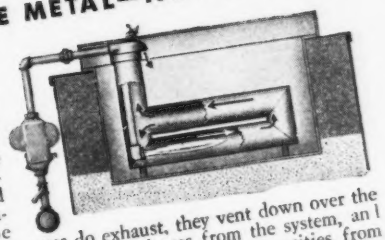
It's not at all unusual for a switch to KEMP immersion-firing to save that much—because the heat (all of it) is liberated right in the molten bath, not outside the pot. And none is lost to the setting except by flow through the work.

By the same token, pot wall temperatures are lower (from the molten material temperature *down*) —and more uniform! That's why you enjoy longer pot life with less down-time for maintenance and repair.

And KEMP immersion-firing tubes can be of any shape you wish. They can be located in the bath where most convenient to your work and your process. You have full freedom in specifying setting style.

There are 29 years of experience in carbureted-combustion and immersion-melting behind the coupon in the corner. Use it.

WITH MODERN IMMERSION-FIRING YOU HEAT THE METAL—NOT THE POT



Combustion is within tubular loops totally immersed in the metal. Recirculation of hot combustion gases around each loop (driven by force of the burner flame) promotes efficiency and uniformity of temperature over the tube surface. When the hot gases do exhaust, they vent down over the molten metal surface, reducing heat losses from the system, and minimizing dross. Standard designs have metal capacities from 2 to 20 tons—special sizes and shapes, and larger capacities, quoted on request.

KEMP OF BALTIMORE

PRECISION CARBURETION + ADAPTED COMBUSTION FOR INDUSTRY'S HEAT-USING PROCESSES

ATMOSPHERE GENERATION & ADSORPTIVE DRYER SYSTEMS FOR PROCESS CONTROL AND PROTECTION

JMLco K-51 Ia

The C. M. Kemp Mfg. Co.
405 E. Oliver St., Baltimore 2, Md.

Have a field-engineer come look at our salt and soft-metal melting set-ups. We want to save 30 to 40% in fuel cost ..... ☐

NAME_____

TITLE_____

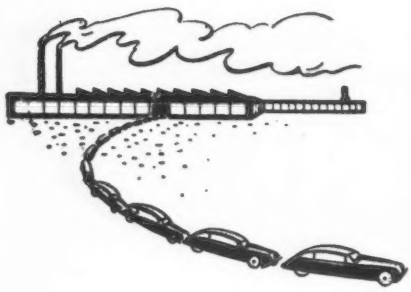
COMPANY_____

PLACE_____

Assembly Line . . .

WALTER G. PATTON

• Chevrolet introduces postwar truck model . . . Ford encourages employes to bring their friends into the organization . . . Dearborn Motors reveals plans for marketing Ford tractors.



DETROIT — May mechanical improvements as well as unprecedented design features have been incorporated in the new postwar "Advance-Design" line of trucks and commercial cars announced this week by Chevrolet Motor Div. of General Motors Corp. Chevrolet's new trucks, known as "Thriftmaster" and "Loadmaster" models, have increased height and width of cab, a new hood, grille and fenders.

Unisteel all-welded cabs, designed for increased strength and durability are featured in the new models. In the unisteel cab the top, side panels, back, windshield frame, cowl, floor, and all ribs and strainers are welded to form a single unit. Similarly, the inner and outer panels of the doors are welded together to give improved strength, rigidity and durability.

Chevrolet's cab seats three men comfortably as the hip width is increased 8 in. The seat cushion and back are adjustable.

Larger windshield glass increases the driver's angle of vision. Safety glass is used throughout the cab.

Scoop-type ventilators on the top and left side of the cowl provide increased ventilation for the cab in hot weather. A fresh-air heater and defroster can be used in cold or rainy weather.

Chevrolet engineers have designed the new cab to minimize vibration and frame weave. The grille, fenders and hood are all attached to the cab as part of an assembly. The front of the cab has a tension and shear mount, while the rear of the cab is mounted on a single shackle at its center. It is claimed that elimination of chassis vibration and frame weave will greatly lengthen the life of the cab and sheet metal parts.

Window and windshield reveal moldings are of highly polished stainless steel. Side window garnish moldings are also of stainless steel.

Instruments have been grouped for easy driver vision. An ash tray and a large sized dispatch box are available to the driver. Facilities are provided for the installation of a push-button truck radio.

Chevrolet has added considerable insulation material, and thicker dash and floor mats provide a cooler, quieter cab. All cab areas subject to splash or moisture collection have been coated to minimize rust.

Front panels and end-gates of the new Chevrolet pick-up models have been strengthened by welded curls. Floor panels have been lengthened. Cross sills have been strengthened to provide additional support to the floors.

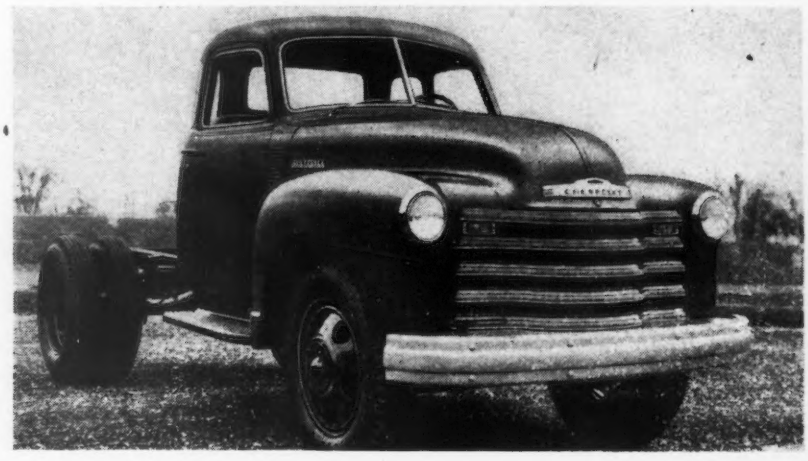
The panel bodies have been redesigned to provide stronger floor sills, body side top rails and top upper rails. Doors and hinge supports have been strengthened and the use of rust inhibiting materials is greatly increased. Rear door windows are more than 70 pct larger than previous models.

The DeLuxe panel body has stainless steel windshield reveal and window garnish and reveal moldings. A chrome plated radiator grille and fender moldings are offered as DeLuxe equipment.

THE frames of all new Chevrolet trucks have been redesigned and strengthened. Side rails of some models have been lengthened so that they extend beyond the front springs and support the bumpers. In the light duty models gusset plates have been added to stiffen the frame and maintain the side rail alignment.

Frames for heavy-duty models weighing 11,000 lb and over are entirely new. The use of frame reinforcements has been discontinued since the new frame is said to be stronger without reinforcements than the old frame was with reinforcements. Both section modulus and size have been increased. Side rail depth is 8⅞ in. with a flange of 2⅞ in. and a thickness of ¼ in.

FIRST SINCE THE WAR: *Chevrolet introduced this new truck this week—its first new truck since the war. Considerably improved driver comfort features the cab. Amateurs may have a three-speed synchro mesh transmission; professionals can have the four-speed sliding gear type.*



UPPING PRODUCTION by 50%

. . . *Accuracy to ±.0005" at Cincinnati Bickford*

New Bullard MAN-AU-TROL Spacers Eliminate Hole-Locating Jigs and Fixtures

Bullard 4"x 4" MAN-AU-TROL Spacer on 24" Cincinnati Bickford Super Service Box Column Upright...holes drilled, bored, reamed...accuracy of ± .0005" instead of former methods' ± .001"... production increased approximately 50%. Comparable results obtained with Bullard 30" x 20" Spacer.

Bullard MAN-AU-TROL Spacers now on production lines are more than living up to advance notices...eliminating jig costs, freeing men for more productive work, increasing volume and accuracy, reducing operators' fatigue. Write for the MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Conn.

BULLARD

CREATES NEW METHODS TO MAKE MACHINES DO MORE

The springs for all new Chevrolet trucks carry new ratings.

Except the ½-ton series, all the new models have full floating rear axles and hypoid ring and pinion gears. The rear axle rating of the heavy-duty single-speed and two-speed axle is increased to 13,000 lb on the new tires.

Three-speed synchro-mesh transmission and four-speed sliding gear transmission are standard equipment. The four-speed transmission provides for a power take-off.

Sheet metal used in the new Chevrolet trucks is selected according to the size of the vehicle, resulting in proper coordination of appearance, strength and durability factors.

Vacuum power brakes are standard on all heavy-duty models and some medium-duty models. Bonded facing is said to increase the efficiency and durability of the brakes on the light-duty units.

Chevrolet engineers predict the striking modern appearance as well as the mechanical improvements of the new trucks will have a strong appeal, particularly to the men who drive trucks. Comfort features built into the new Chevrolet models were determined by a nationwide survey which gave Chevrolet engineers first-hand information as to what users wanted in trucks. The latest models incorporate the features requested by truck owners and drivers, according to the Chevrolet engineering department.

THE salaried personnel department of Ford Motor Co., receives a considerable number of requests from employees wishing to refer friends and acquaintance for employment.

In response to this demand, Ford has prepared an employee recommendation form to be used by employees who wish to recommend a friend for employment in the company.

The employee recommendation form is composed of two sections: The first section is sent in by the employee, while the second form is to be completed by the applicant the employee wishes to recommend. This form then serves to introduce the prospective employee to the company. Where an employee qualifies for a position but no opening exists, Ford holds the application in its active file. When an opening does occur, the applicant is contacted at the first opportunity by the Ford placement bureau.

Dearborn Motors Corp. which markets Ford Tractors is planning an extensive advertising and sales promotion campaign in the farm equipment industry.

In addition to a $2 million advertising and sales promotion campaign, Dearborn Motors will hold distributor-dealer meetings in 33 cities between July 15-30.

Dearborn Motors figures there is a large unfilled market for farm equipment in this country and the strong financial position of the farm industry should prove to be an important element in the sales outlook for tractors. Frank R. Pierce, president of Dearborn Motors Corp., points out that between 1918 and 1946 the number of horses and mules in this country declined by approximately 15 million. During the same period, he said, the number of tractors increased from 75,000 to more than 2¼ million.

Since 1940, he continued, Michigan farmers are using an additional 28,000 tractors. The increase in Ohio has been 36,000 in the past 6 years; in Indiana, 28,000; Illinois, 45,000; and New York, 25,000.

Meanwhile, there are reports that Harry Ferguson, Inc., which formerly distributed Ford tractors in this country has extensive plans for increasing the capacity of its English plants. It will be recalled that Ferguson was disappointed in his efforts to obtain financing in this country and that plans for producing Ferguson tractors in the United States have been shelved. The present prospect is that Ferguson tractors, if they are to become available to American farmers, will have to be imported into this country from England.

BOSS KET'S BOYS: *Here are the men on the GM research staff who worked with Charles F. (Boss) Kettering in the development of new GM high compression fuel-saving engines. Standing: J. M. Campbell, A. F. Underwood, C. F. Kettering, J. P. Brannan, D. F. Coris, W. G. Lovell. Below are: T. O. Richards, R. A. Richardson, A. D. MacDuffie.*

Kaiser-Frazer Corp. Buys Michigan Foundry

Detroit

• • • **Kaiser-Frazer Corp.** bought the foundry facilities of the Round Oak Co., Dowagiac, Mich., on June 16 for $262,000 "cash and other considerations," according to a company spokesman. The purchase includes foundry facilities as well as a stove manufacturing plant.

Capacity of the foundry is 120 tons per day. Approximately 350 workers are employed in the plant which will be known as the K-F Dowagiac Foundry Div.

The purchase has been made to increase the supply of small castings required for the K-F engine production program. Round Oak has been supplying a portion of the K-F engine manifold castings.

Washington . . . EUGENE J. HARDY

• Additional steel capacity likely to be recommended by Commerce or FTC . . . Commerce text on industry delayed . . . FTC report will probably follow line of earlier study on copper industry.

WASHINGTON — Despite many official denials, recommendations for an increase in steel industry capacity are in the wind. Two government bureaus—the Dept. of Commerce and Federal Trade Commission—are the probable sources of a recommendation of this sort.

The Commerce compendium on iron and steel has been delayed until late October or early November. However, Commerce is trying to speed it up and may have the document ready for issuance earlier in the fall. It is currently being reviewed by a special task group of the American Iron & Steel Institute. It is this reviewing which is one of the delaying factors; the other is the fact that the job turned out to be bigger than originally planned.

While the original intention had been to include a chapter on the industry's outlook, covering capacity and many other factors, strenuous protests from many quarters resulted in this section being dropped from the Commerce textbook. Still, reports have persisted that the completed work will contain recommendations for expanding the capacity of the industry.

Bearing out the old phrase—"where there's smoke there's fire"—THE IRON AGE was told last week by a Commerce official that while there would be no forecasts or predictions in this study, it "was not unlikely that a separate study" covering these troublesome points would be issued.

Such a report would be a policy job, bearing the official stamp of the Department, and would probably not be subject to outside review. It is admitted, however, that such an undertaking would be difficult, requiring the complete cooperation of steel consumers, if it were to be at all accurate.

LENDING credence to the above report is a recently published study by R. M. Weidenhammer, Chief of the Commerce Dept.'s Division of Machinery and Metals, in which he estimates U. S. demands for copper, lead and zinc, 1947-1960. Mr. Weidenhammer, who has been in charge of the iron and steel projects, also presents in this study a graph which forecasts U. S. consumption of major metals minerals from 1946 through 1960.

Included in this graph are forecasts for finished steel and electric furnace steel. The following are his estimates for these two products for the years 1950 and 1970, in tons:

U. S. Consumption

Finished Steel	High	Low
1950	73,000,000	64,000,000
1970	80,000,000	70,000,000
Electric Furnace Steel		
1950	3,000,000	2,500,000
1970	6,000,000	4,000,000

The high estimates assume full employment, while the low figures account for 15 pct unemployment. In fairness to Mr. Weidenhammer, it must be stated that he does not rely implicitly on these figures, but points out that their usefulness is predicated on the continuation of industry trends which have been charted since 1888. He does not believe these trends will continue, but will be interrupted by a variety of factors, such as technological changes and material substitution.

Nevertheless, the presentation of such material indicates the train of thought within the Department on the part of officials who have been working on the iron and steel text. It must also be remembered that the original outline for the Commerce study called for the inclusion of a chapter dealing with the outlook for iron and steel covering longterm demand during the years 1947-60, based on past trends, national income, requirements of consuming industries, and shifts in regional markets. While this chapter has been dropped, some work has been done on these topics, and it can be readily seen that any future Commerce report dealing with such forecasts would necessarily have to go into industry capacity.

The steel investigation at FTC is also continuing and there will probably be a report issued for the information of Congress, but no time schedule has been worked out. The Commission is analyzing current operations of the industry, particularly the pattern of production and distribution and its effect on steel users.

THE study of gray markets has lost some of its prominence in the minds of FTC officials, who have been watching with interest the proceedings of the Senate Small Business Steel Subcommittee. FTC seems willing to let the Senate group carry the ball for the time being, or at least until it appears that this investigation is beginning to falter. This does not mean that FTC has lost interest in gray market proceedings, but merely that, for the present, they are willing to watch and wait.

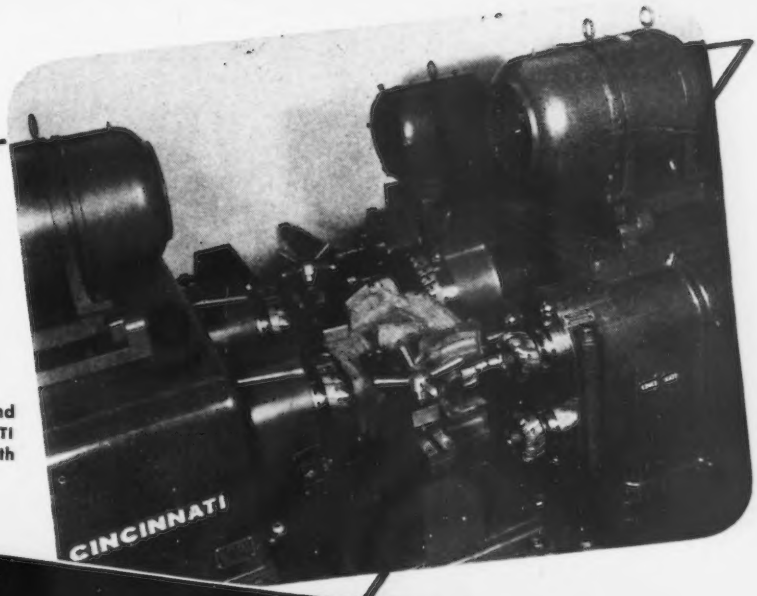
It is realized that the gray market distortions are merely part of the basic problems which trouble FTC, namely, the entrance of integrated producers into the field of processing and fabricating of both capital and consumer goods and probable inadequate iron and steel capacity to maintain a high level of employment.

It is also realized that in practically all cases of gray market operations, basic steel producers are unaware of their existence and not responsible for the deals.

Back of the FTC work is a growing belief that there should be more light on the current operations of the iron and steel industry, particularly in regard to concentration

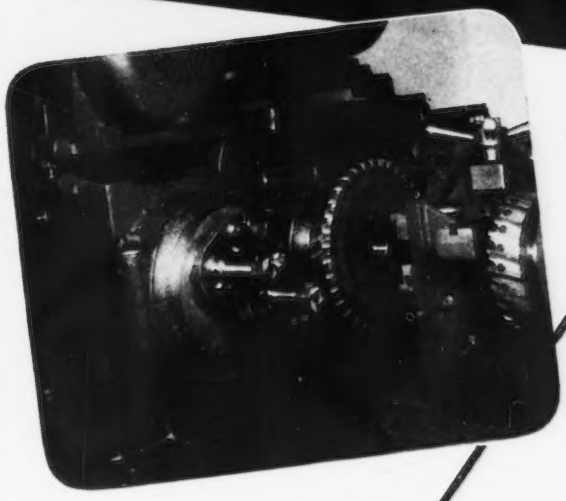
[CONTINUED ON PAGE 80]

CINCINNATI Duplex Hydromatics are available in 12 sizes. No. 4-48 illustrated. Catalog M-1372-1 contains complete specifications and other important details.

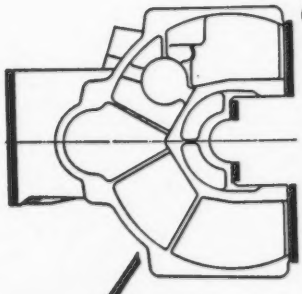


Right: Close-up front view of the spindle heads and fixture, during the cutting cycle of a CINCINNATI No. 56-72 Duplex Hydromatic Milling Machine, with special right- and left-hand headstocks.

MULTIPLE SPINDLE HYDROMATIC mills several surfaces, rough and finish — in one pass!



Close-up of the rear view, showing the arrangement of finishing cutters.



Drawing of cylinder block milled on the equipment illustrated here. Heavy lines indicate milled surfaces. Production averages 8½ per hour.

• Two well-known ways to reduce manufacturing costs... by eliminating handling, and by combining operations... have been incorporated in the equipment illustrated here. The machine is a CINCINNATI No. 56-72 Duplex Hydromatic Miller, with special multiple spindle headstocks, tooled up by Cincinnati Application Engineers to rough and finish mill the top, pan rail, and bearing seats of farm tractor cylinder blocks. There are eight spindles and eight cutters; six are sintered carbide, while the two small ones at the rear are high speed steel. The cutters toward the front (one on the left and three on the right—large illustration) rough mill all the surfaces, and then as the table continues its traverse, the cutters at the rear (photo at left) take a finishing cut.

Through the CINCINNATI Hydromatic method of automatic variable feed control, the table traverses at 12 inches per minute for the rough cut, and 18 inches per minute for the finish cut. Production averages about 8½ cylinder blocks per hour.

This equipment, a Cincinnati design for lower cost milling operations, eliminates excessive handling of the work; combines operations; offers special machine performance on equipment built around standard units. ¶ The facilities of Cincinnati Milling's extensive Research Department, and their 63 years of milling know-how, are available to you for reducing milling costs in your shop. It will pay you to present your milling problems to them.

See the CINCINNATI MILLING DISPLAY at the MACHINE TOOL SHOW, Chicago, Sept. 17-26

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

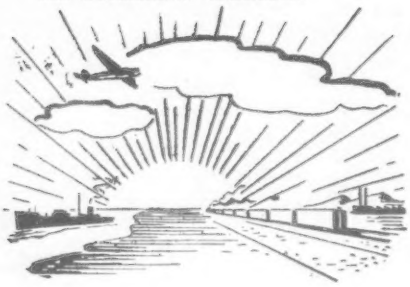
CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES

West Coast . . .

ROBERT T. REINHARDT

• Westward migration and seasonal factors increase percentage of unemployed in expanding labor force . . . Geneva exceeding rated production capacity . . . Taft-Hartley bill casts its shadow before.



LOS ANGELES—No area was considered to be more vulnerable to reconversion deflation than Los Angeles. It ranked second only to Detroit in war production, and had shown a larger percentage gain in industrial output than any other great industrial area. Moreover, it had the greater part of its war production facilities in the unusually hard to reconvert aircraft and shipbuilding industries.

It is by now common knowledge that the actual experience of this area has been much more fortunate. It has weathered its reconversion hurdles of the past 20 months remarkably well. Total employment dropped only slightly following VJ-Day as heavy cuts in war industries were counterbalanced by increases elsewhere. The labor force remained nearly constant for a short time and then began to increase again. Large numbers of persons, including many women, overaged and teen-aged persons left the labor force, but the return of the war veterans and the heavy tide of in-migration more than offset them. By January 1946 the labor force had risen to 1,435,000 and by April of this year the wartime peak had been passed and a new all-time high of nearly 1,560,000 was reached, according to a report, "A Post-War Business Review of the Pacific Southwest," issued by the U. S. Dept. of Commerce.

Unemployment in the area rose sharply to a level of more than 189,000 persons, which was 13 pct of the labor force in January 1946. Some decline both in numbers and percentage occurred later in 1946, but by February 1947 unemployment had risen again to 195,000 or approximately 13 pct of the labor force. The Apr. 1, 1947 figure was 197,000, still nearly 13 pct. The California Dept. of Employment estimates that net in-migration into Los Angeles County is now running at about 10,000 per month, of whom about 4000 enter the labor force.

The growing surplus of labor in Los Angeles County is beginning to include almost every type of worker. Unemployed "white-collar" workers are increasing, and clerical and sales jobs are harder to get. Specifications are rising and down grading of jobs is fairly prevalent. Employers are reporting larger numbers of gate applicants for industrial jobs and state that they are, on the average, much better qualified than previously, according to the Dept. of Commerce report.

SAN DIEGO—The war boom here resulted largely from aircraft, shipbuilding, and government establishments. Although its labor force is far below its wartime peak, it remains about 38 pct above prewar. Government employment has been fairly well maintained since VJ-Day, partly as a result of rapid demobilization, which required substitution of civilian employees for enlisted personnel for many routine duties. Further declines in government employment are expected, however.

Unemployment is heavy in the San Diego area, running current at about 21,000 or nearly 16 pct of the labor force. Nonmanufacturing industries have reduced employment along with aircraft and shipbuilding declines. Trade and service industries have felt the loss of business due to the decreased number of servicemen stationed in the area. Employment remains well above 1940 and manufacturing employment is more than half again as large as prewar. But job opportunities are decreasing at present in

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WIDE RANGE OF STANDARD LOW PRICED CARBOLOY BLANKS AVAILABLE FROM STOCK

GENERAL PURPOSE CARBOLOY BLANKS

From 60% to 80% of your single point turning, facing, boring jobs can be done with 5 styles of these standards.

SPECIAL PURPOSE CARBOLOY BLANKS

Standard reamer, scraper and lathe center blanks offer maximum economy for these special uses.

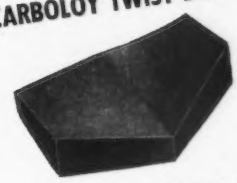
SOLID CARBOLOY CYLINDERS (GROUND)

Adaptable to solid boring tools, tool bits and wear resistant uses, a stock of these solid Carboloy cylinders in your tool crib will provide for many uses.

SOLID CARBOLOY ROD (UNGROUND)

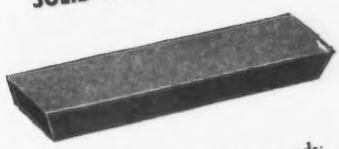
Stocked in 15 diameters from 1/64" to 3/8" in random lengths from 4" to 12". Priced as low as 12c per inch. Excellent for wear resistant uses.

CARBOLOY TWIST DRILL TIPS



For economical drilling of cast iron and non-ferrous metals. Priced from 15c up. Wide range of sizes. Immediate deliveries.

SOLID FACE MILL BLADES



Blades ground on three sides ready for use, with clearance angles formed (not ground) on both ends, for either right or left hand cutters.

SOLID GROUND BALLS

For long economical life on sizing and burnishing operations. Also used in check valves. Sizes 1/8" to 1".

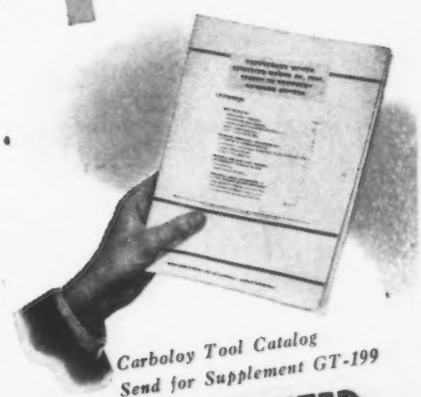
SOLID GUIDE RINGS

For use as a guide for textiles, wire, and similar wear-resistant applications. Now widely used on better fish rods.

BLANKS FOR THREADING TOOLS

Stocked for use in tool sizes 3/8", 1/2", 5/8", 3/4". Priced 26c to $1.00. Standard in Grade 78B.

Low priced standard Carboloy Blanks are available to you not only for lathe-tool use but also to cover diversified range of other cutting and non-cutting applications, as illustrated above. Prices and specifications of recently announced new blanks, as well as revised prices and specifications on a number of previously established standards, are contained in our recently published catalog supplement GT-199. Copies gladly mailed upon request. Carboloy Company, Inc., 11107 E. 8 Mile Ave., Detroit 32, Michigan.



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Standards are stocked in 74 cities coast-to-coast

CARBOLOY (REG. U.S. PAT OFF.) **CEMENTED CARBIDES**

San Diego County, the Dept. of Commerce survey went on.

SALT LAKE CITY—At the end of its first year of operation under ownership of U. S. Steel Corp., the Geneva steel plant is operating at a rate well above the figure estimated by the corporation as usable capacity at the time of the purchase.

At the current operating level, monthly production is 45,000 tons of plate, 15,000 tons of structural products and 20,000 tons of pig iron. The pig is being shipped to the Pacific Coast for foundry and steelmaking purposes. This is roughly 120 pct of the capacity filed with the American Iron & Steel Institute.

Employment at the plant itself, which was down to 600 a year ago, is now 4000. Overall employment of corporation subsidiaries in the state is 5500—4600 at Geneva, Ironton and the quarry in Utah County; 800 at the coal mines in Carbon and Emery Counties; and 100 at the iron mines in Iron County.

Limiting factor on production during this first year according to Walther Mathesius, president of Geneva Steel Co., has been the supply of coking coal. Coal output has been limited by availability of miners and housing has been the major factor in the manpower problem. A step toward a solution was the purchase by the corporation of the government-owned town of Dragerton. Another step will be the expenditure of about $1 million to add facilities to the community and to make it attractive by paving streets and sidewalks and providing other improvements.

The projected conversion of the Geneva plant rolling mill to the production of hot-rolled coils has moved slower than anticipated for two reasons. The necessary equipment will not be available for some time and the demand for the few products the plant now produces is ing at capacity without conversion. In a way this situation may prove advantageous to the area from which the plant draws its labor supply. If the conversion program can be pushed as the demand for heavy plate starts tapering off, the employment pattern can be leveled out, Geneva officials point out.

Nonferrous metal mine operators and the International Union of Mine, Mill & Smelter Workers are engaged in preliminary sparring on so heavy that it can be kept operata new wage contract. The 2-year agreement signed last year provided that only the wage scale would be up for adjustment this year. But the union is determinedly trying to bring in a large number of fringe issues. Obvious strategy of the union negotiators is to clamor so loudly for a straight 25¢ per hr wage increase that the operators will let some of the other issues in for trading purposes.

SEATTLE—That the fate of the Taft-Hartley Bill was having considerable bearing on the thinking of labor in this area was evident last week. The Aeronautical Mechanics Union which requested a strike sanction on May 24 was put in a rather uncomfortable position and it is believed that their International was withholding action on the sanction pending the outcome of the labor bill.

There is also some conjecture as to whether the pending labor legislation had some effect on the move to compel the Boeing Aircraft Co. to recognize the Seattle Supervisors Lodge 1750 which is affiliated with the AMU. Some 400 supervisors voted against a strike to bring about this recognition.

Approximately 65 pct of the supervisors voted in favor of the strike but an additional 10 pct was needed to legalize the proposed walkout. A large number of the foremen failed to show up at the meeting. Observers believe that the pending strike is losing ground and they point out that while Boeing is reported to be offering 10¢ an hr increase which has not been found satisfactory to the workers, Lockheed settled with its workers for a 5¢ an hr increase. Because of the strain of waiting 4 weeks to go out on a strike which has already been voted, some of the members of the union are apparently getting a little jittery. Last week about 84 of the employees in one shop stayed off the job apparently to demonstrate their unrest over the present situation. Harold Gibson, president of Local 751, instructed all shop stewards to tell the members to stay on the job and the next day a full complement showed up.

Automotive machinists, which had been out on strike for 24 days against the Kenworth Motor Truck Corp. gained 60¢ a week over the original 12½¢ per hr increase offered by the corporation when they went back to work for 14¢ per hr total increase. It will be some time before the workers make up the difference for the time lost through the 1½¢ an hr gain they effected by their strike.

All efforts are being made to get the Kenworth plant back in full operation but it was expected that at least a week would be required before full employment could be effected.

According to the USES, the job situation is tightening up in general as the city is flooded with college and high school students looking for jobs for the summer.

There is still a demand for skilled and trained personnel whereas common labor is overabundant.

Construction figures indicate that while employment is greater in this field than a year ago, apparently the most activity is in the lighter field and that heavy construction is being definitely postponed because of costs. Public works and state highway construction are affording principal employment in heavy work.

Lumber, which has until recently been very scarce, is now reported as plentiful and as being stocked at the mills. Steel is still moving from the mills as rapidly as it can be produced but there is considerable evidence of a reduction in the size of individual orders. It is the consensus that as long as construction costs remain high and with labor rates steadily increasing, that postponement of major construction will continue and that many proposed projects may eventually be entirely abandoned.

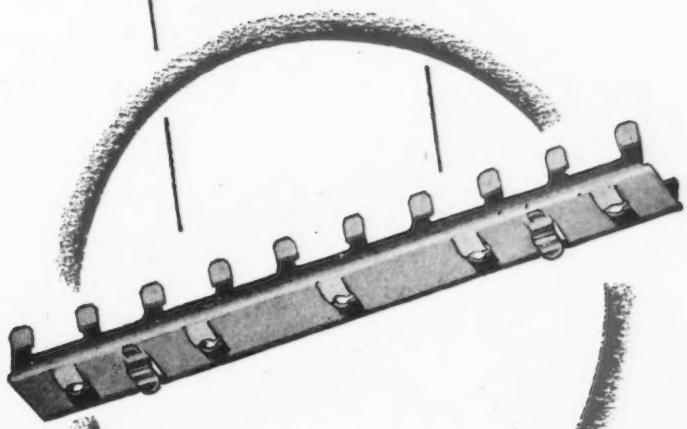
Bus Frames Ordered

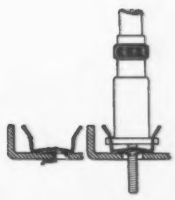
Birmingham, England

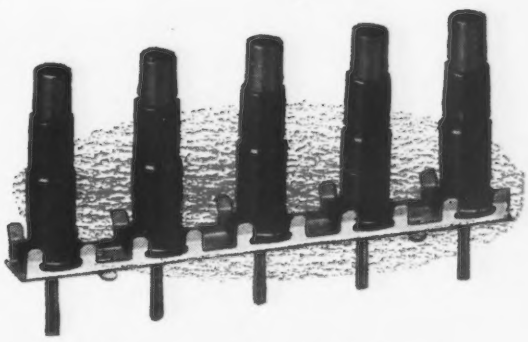
• • • **Tube Investments, Ltd., demonstrated here on June 2, a prefabricated all-metal frame for omnibus bodies. Based on wartime technique, a 25 pct saving in paneling time and a 20 pct saving in weight are claimed. A double-deck skeleton frame can be assembled in 22 man-hours. The frame can be packed for export in a small crate. Overseas orders have already been accepted.**

THIS IS A SPEED NUT*

and







THIS *is also a* SPEED NUT

It looks more like a caterpillar than a nut, doesn't it? But a nut it is . . . or rather, five SPEED NUTS combined into one, to simplify and improve the assembly of multiple coil forms on radios.

This one ingenious fastener replaced eight separate parts formerly used and eliminated expensive drilling and tapping operations. It retains the tuning cores and screws, provides exactly the right tension on the screws, and its spring arms hold the plastic coil tubes securely in place.

This is just one example of hundreds where the basic SPEED NUT principle is applied to develop a special fastener for better, more economical assembly. SPEED NUT brand fasteners may be the answer to your quest for lower assembly costs, so be sure to investigate these streamlined fastening devices. Write us today, including engineering details, and we'll give you a complete, no-charge analysis.

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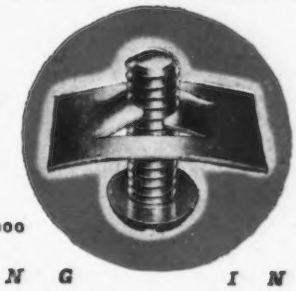


Speed Nuts* PATENTED

*Trade Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES

FASTEST THING IN FASTENINGS

[CONTINUED FROM PAGE 74]

of control. This trend of thought follows the same line which was evident in the report on the copper industry (THE IRON AGE, Mar. 27, p. 109) the first of a series to be issued on the nation's basic industries.

As to capacity, FTC has made no definite statements in this regard, but it can be readily assumed that this will be a subject of any eventual report. However, FTC realizes that even if a need for increased capacity can be proven, the industry is warranted in moving slowly. While it is conceded that the addition of new rolling facilities would ease current shortages of particular products, there is some doubt whether ingot capacity would be sufficient to maintain continued operation of the industry's rolling facilities.

THE impact of the forthcoming multi-billion dollar foreign rehabilitation program also weighs heavily in the minds of Washington planners who are concerned with the nation's industrial system.

The material being gathered by FTC has been gleaned from many sources, including field trips, data submitted by producers and consumers, as well as trade associations and published data.

The Pressed Metal Institute has been particularly helpful in filing material with the Commission. Recently, the institute presented a brief, which in part advocated a return to the "Pittsburgh Plus" system of pricing. While much of the institute's material has been helpful, this recommendation fell on almost deaf ears at FTC, which, as stated by one official, is opposed to all forms of "price manipulation." In fact, the Commission is hopeful that a favorable decision in the Cement Institute case (THE IRON AGE, Jan. 30, p. 101) now before the Supreme Court will outlaw practically all basing point pricing systems.

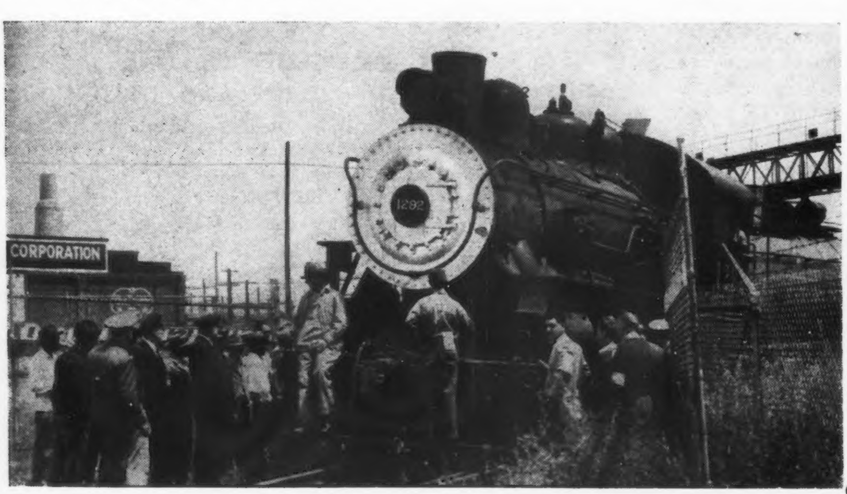
ANOTHER material, steatite talc, may soon have to be added to the list of subsidized minerals if domestic production is to be continued, it is indicated by testimony given before the Special National Resources Economic Subcommittee of the Senate Public Lands Committee. American producers have told the Committee that they cannot long stand competition from foreign production, chiefly Italian and French, where labor and other costs are much lower, unless help is given through either tariffs or premium payments.

At the present time, the Committee was told, a large proportion of the lead and zinc currently produced in the United States is mined under the premium price program. For the month of March 1947, as an example, the percentages were 52 pct for lead and 73 pct for zinc; the copper mines required less subsidization, about 5 pct of the March output having been produced through bonus payments.

According to Clarence O. Mittendorf, head of the premium price program, the subsidy program for copper, lead and zinc has cost the government about $336 million for the 5-year period, February 1942 till March 1947.

The Senate hearing is concerned at the moment with whether American natural resources can best be conserved through subsidization to mine out the last pound of marginal and other high cost ore or to increase importation of scarce metals and minerals.

IRON HORSE BALKS AT PICKETS: *A switch engine routed over a spur track shared by the Judson Steel Corp. and the Judson Pacific-Murphy Corp. at Emeryville, Calif., was stopped by striking CIO steel workers from the former company as it attempted to serve the latter last month. Judson Pacific-Murphy Corp. employed non-striking AFL workers. Police cleared the tracks and the locomotive rolled through without incident. Photo courtesy* **Oakland Tribune.**



Ladish Co. Purchases Steel Forging Plant

Washington

• • • **WAA has approved** the sale of surplus steel forging facilities in Cudahy, Wis., to the Ladish Co., Cudahy, which operated them under a lease under the name of the Ladish Drop Forge Co. during the war and produced forgings for the Army Air Corps bomber programs. The sale price was $2,200,000.

The original cost of the project was $10,461,877. The fair value of the property sold was fixed at $2,250,000. Not included in the sale are facilities costing about $1 million which are to be removed and standby facilities having a value of approximately $3,343,450, which are subject to the National Security Clause and for which the company will have no need, but it will pay all maintenance and other expenses on the latter facilities.

WAA said the company intends to revamp the plant at a cost of $1,500,000 and that later it will invest $2 million in machinery and equipment and produce commercial forgings, chiefly for automotive and farm machinery and pressure piping.

Reports on WAA Donations

Chicago

• • • **The WAA Chicago** regional office has announced that more than $160,000 worth of surplus machine tools were given to schools and municipalities during the inauguration of the machine tool donation program at the Nash-Kelvinator plant, Kenosha, Wis.

Yet Its Tensile Strength is 200,000 psi!

If you can improve your products with "tissue-thin" strip steel you'll want to consider the many remarkable properties of ARMCO Thin-Gage Stainless Steels.

For example, this rustless steel can be supplied so thin that you can crumple it in your hand or tear it with your fingers. Yet its full-hard tensile strength is 200,000 psi!

MANY ADVANTAGES

Along with high strength/weight ratio you get excellent corrosion resistance and attractive appearance. To your production line it brings all the cost-saving advantages of coils — no hand-feeding. relatively no end-of-strip scrap losses, and faster production.

A war-born development of Armco Research, this chromium-nickel stainless steel strip is rolled as thin as .001, in coils *up to 13 inches wide*. Its gage-uniformity is remarkable. There is no "crown" in the center.

YOU NAME IT

Peacetime uses are diversified — from heddles and drop wires in textile looms to pen points; from flexible metal hose to thermostat diaphragms and weather-stripping.

Just fill in the coupon for more information about ARMCO Thin-Gage Stainless Steel. The American Rolling Mill Company. 2211 Curtis Street, Middletown, Ohio.

STAINLESS ARMCO STEEL

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For these products_____

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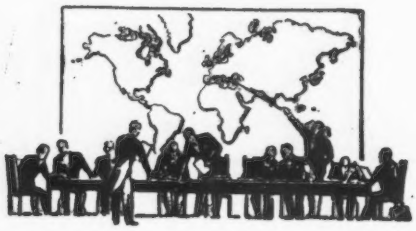
European Letter . . .

• Marshall states that American people should realize and accept their vast responsibility in helping European countries . . . Challenges nations to produce their own plans for reconstruction.



LONDON—"The rehabilitation of the economic structure of Europe quite evidently will require a much longer time and greater effort than has been foreseen." With these words, the American Secretary of State, Mr. Marshall, opened what may well be a new phase in the relations of the United States with Europe and indeed with all the outside world.

Hitherto, the belief that Europe and Asia were struggling back to more normal conditions and would shortly need no further direct assistance has underlain the policy of both government and Congress in the United States. Marshall's speech at Harvard recently was the first official statement of a new approach, in which the likelihood of continuing need in the outside world is squarely faced.

Moreover, the Secretary of State departed from previous policy in recognizing the fact that the misery of the countries of Europe is interconnected and that there can be no genuine recovery for one without the recovery of all.

In his speech, Marshall, therefore, proposed on the one hand that the American people should realize and accept the "vast responsibility which history has clearly placed upon our country," and on the other, that the European nations should take the initiative in working out a plan or plans for reconstruction based not on the needs of single countries but on a coordinated policy for solving their problems in common.

IT is hardly necessary to underline the dramatic importance of this speech. Marshall may not command a secure congressional majority but he speaks with very great authority and has, moreover, received presidential sanction for this policy. Mr. Truman in his speech at Ottawa pledged his country to the task of "restoring the world to health."

It is, however, almost equally unnecessary to underline the scale of the obstacles such a program has to overcome before its vision can become practical politics. It is not enough that President Truman, Mr. Marshall and the American Cabinet should be convinced of the rightness of the new approach. It is not enough that they should be supported by some of the leading newspapers and publicists in the United States.

The real question is whether the people of the United States and their elected representatives in Congress can be persuaded to accept the need for foreign relief upon a sufficient scale. The administration has stated that the appropriations for Greece, Turkey and American-occupied lands, together with the $350 million voted for relief, exhaust the requests that will be put before the present session of Congress for government expenditure overseas.

And at the end of this month, the last powers—admittedly very weak powers—under which the President can secure priorities for procuring and transporting relief goods will presumably lapse.

Reprinted from The London Economist by special permission.—Ed.

Perhaps these difficulties should not be pressed too far. When, during this troubled session, the President has asked Congress for appropriations in support of his foreign policy, they have not, in spite of much noise and great delay, actually been refused. It is true that the circumstances in which the policy has been pursued are changing. The approach of election year is sapping the foundations of agreement between the parties on foreign policy.

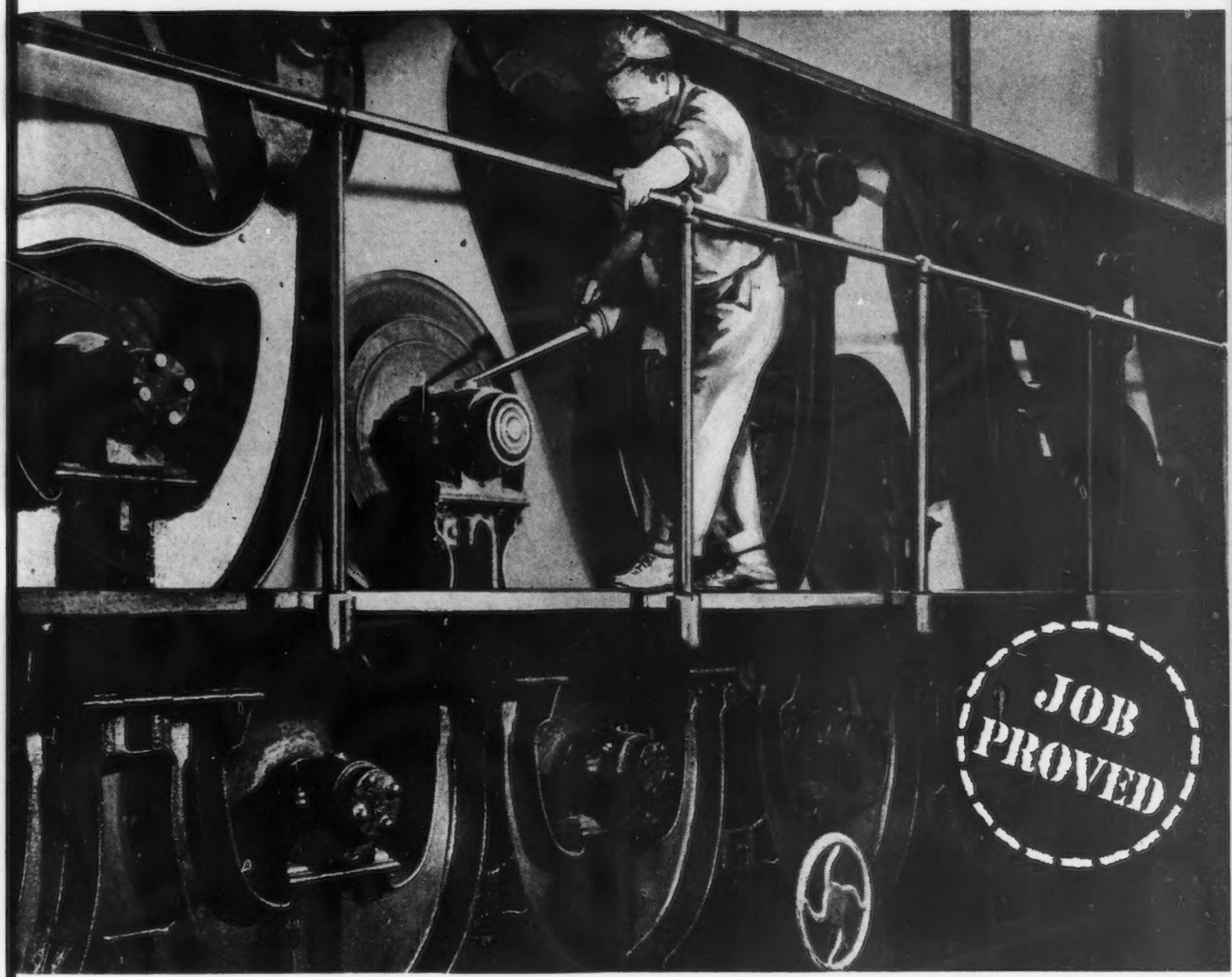
But the postwar economic recession seems to be approaching no less inexorably, and its effect is less easy to predict. The hint of a slump may, in the next few months, make Congressmen—especially Republican Congressmen—less anxious than they are today to finance grandiose plans of public expenditure, the immediate beneficiaries of which are foreign countries. The doctrine that deficit finance and public works are the answer to economic depression, is by no means universally accepted in America, and overseas public works can be expected to be less attractive than the domestic variety.

On the other hand, it will not require much subtlety of logic to perceive the real effect of foreign needs on American prosperity. At the moment many commodity prices are being held in the markets of the United States at their present peaks simply by the pressure of foreign buying. This is particularly true of farm prices. If the flow of dollars is now to dry up, it is at least possible that the reaction of the farm bloc will be to support the continuance, even if by government financing, of a large export program.

IT is thus on the present showing of Congress difficult to determine with absolute certainty what the reaction to Marshall's suggestion might be. Some things, however, are certain. The first is that Europe's dollar holdings are becoming exhausted with such alarming speed that a plan for preventing further disintegration and collapse is not an academic desirability but an urgent need. In other words, Congress must either decide upon further aid in a special session this autumn or the "economic, social and political deterioration of a very grave character" forecast by Marshall may quickly come to pass.

But it is certain that no Congress, meeting on the eve of what will be virtually a year's electoral campaign for the Presidency, will consent to foreign aid on so vast

Ends Chronic Bearing Trouble



SUN BEARING LUBRICANT...

Eliminates Need for Frequent Dismantling

A big mill, making paperboard, was being slowed down by lubrication trouble on the drier rolls. Carbon accumulated regularly in the ring-oiled bearings, causing the rings to stick. As a result of improper lubrication, power consumption increased. The bearings had to be dismantled frequently. Meanwhile production stopped and maintenance costs piled up.

A Sun Engineer recommended a lubricant that had been "Job Proved" in dozens of paper mills. With this oil, the trouble stopped and carbon practically disappeared.

A labor saving of about 500 man-hours per year, plus an annual saving of $320 on oil, has resulted, and more continuous production has been possible. This is a typical example of how Sun Lubricants keep production up and costs down.

In mills, mines, factories wherever machines are operated, you'll find Sun Engineers and Sun "Job Proved" lubricants at work. For full information call your nearest Sun office. Or write Department IA-6.

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a scale unless the issue has become, in the fullest sense of the word, bipartisan. It is certainly impossible that Republican leaders of the stature of Senator Vandenberg should support Marshall's approach. Mr. Stassen, on the liberal wing of the party, has already given his own version of it.

But any politician, Democrat or Republican, will have his ear very near to the ground this summer, and in the last analysis it will be the reaction of public opinion to Marshall's lead that will prove the test of whether his policy can be lifted out of the party arena in an election year.

This fact is, in a sense, Marshall's great opportunity. He, the administration, the State Dept., the publicists who support him, have a few months in which to project into the American consciousness the need for organizing a vast transfusion of dollars for the anemic economy of the world and regain for it widespread and vigorous public support. And experience of American reactions in the past would suggest that on one condition only could that measure of approval be secured—if the policy were bold, sweeping, adventurous, and very big. In fact its chances of success would almost certainly increase in direct proportion to its size.

A suggested allocation of $10 to $15 billion a year for world reconstruction would almost certainly prove more challenging to the imagination, and thus more likely to secure acceptance, than the meager $400 millions proposed for Turkey and Greece. If the new project is to be sold to American public opinion in time for a Congressional session in the autumn, it is on this scale that Marshall and his lieutenants will have to make their plans.

CONVINCING the American public of the necessity of a vast new policy of foreign aid is only half the problem, perhaps the less difficult half. The American voter will not only want to know about Marshall's good intentions, he will also want to know on what the money drawn from his pocket is to be spent. But Marshall feels very naturally that the United States cannot begin imposing precise plans upon Europe as a condition of assistance.

He has therefore challenged the nations of Europe to produce their own and to bring them together into a coordinated whole. In this way, not only will the point be met that the reconstruction of a single country depends largely on the restoration of its neighbors. There is also a chance that the scheme will be sufficiently grandiose to fire American imagination and convince the taxpayer that his money is to be well spent.

Nevertheless, the practical development of Marshall's idea is far from easy. The first difficulty is that, in a sense, it bypasses Europe's most immediate needs. In the 3 months which must elapse before the harvests are brought in, there is hardly a country in Europe that is not faced with a food crisis. The need is particularly urgent in France and Western Germany, and grows daily graver in Italy. And their food shortages are likely to be followed before long by a coal famine.

If Europe is not to go into next winter in worse shape than it emerged from the last, its immediate need is for increased deliveries now of American grain and coal. Such a policy would entail making dollars immediately available to countries whose present allocations are all but exhausted, it would entail maintaining sufficient federal powers to secure priority for food and coal for export and to see that sufficient transport was available to get the material to the ports.

But Marshall's approach clearly does not refer to the next quarter of this year, and of its very nature it cannot be made applicable to an immediate crisis.

THE reason for this is obvious. The moment there is question of elaborating joint long-term plans for reconstruction, the process must be exceedingly slow. For instance, it must first be decided within what general framework the discussions are to take place.

One possibility would be to use the European Commission and the subsidiary coal, transport and economic coordinating committees as the instruments of planning. The machinery would then cover all Europe and would have the asset of a year's work behind its deliberations.

On the other hand, the actual experience of the European Commission's workings in the first weeks of its existence do not encourage great optimism. The great political advantage of the Economic Commission for Europe—that Russia is a member of it—is a great disadvantage for the rapid formulation of practical policies.

There is only one method of procedure that holds out much hope of success. This is that the governments of Western Europe should, within the next few months, solemnly pledge themselves to the principle of united action, and that they should set themselves a specific time-table for embodying it in practical measures.

What does "united action" mean? If it is interpreted to mean pious resolutions with no real substance, then it is unlikely that the Americans will be impressed. If united action is sought it will be as well for all Europeans to recognize that the solemn resolutions, must have tangible substance. They must, promise something real—even if the performance has to be deferred.

When the problem is looked at in this way, it ought to be apparent that there is only one thing that will meet the case. There is only one achievement big enough to be worth scores of billions of dollars, and that would be a full Customs Union of the main countries of Western Europe.

Rumania to Build Coke Oven Plant

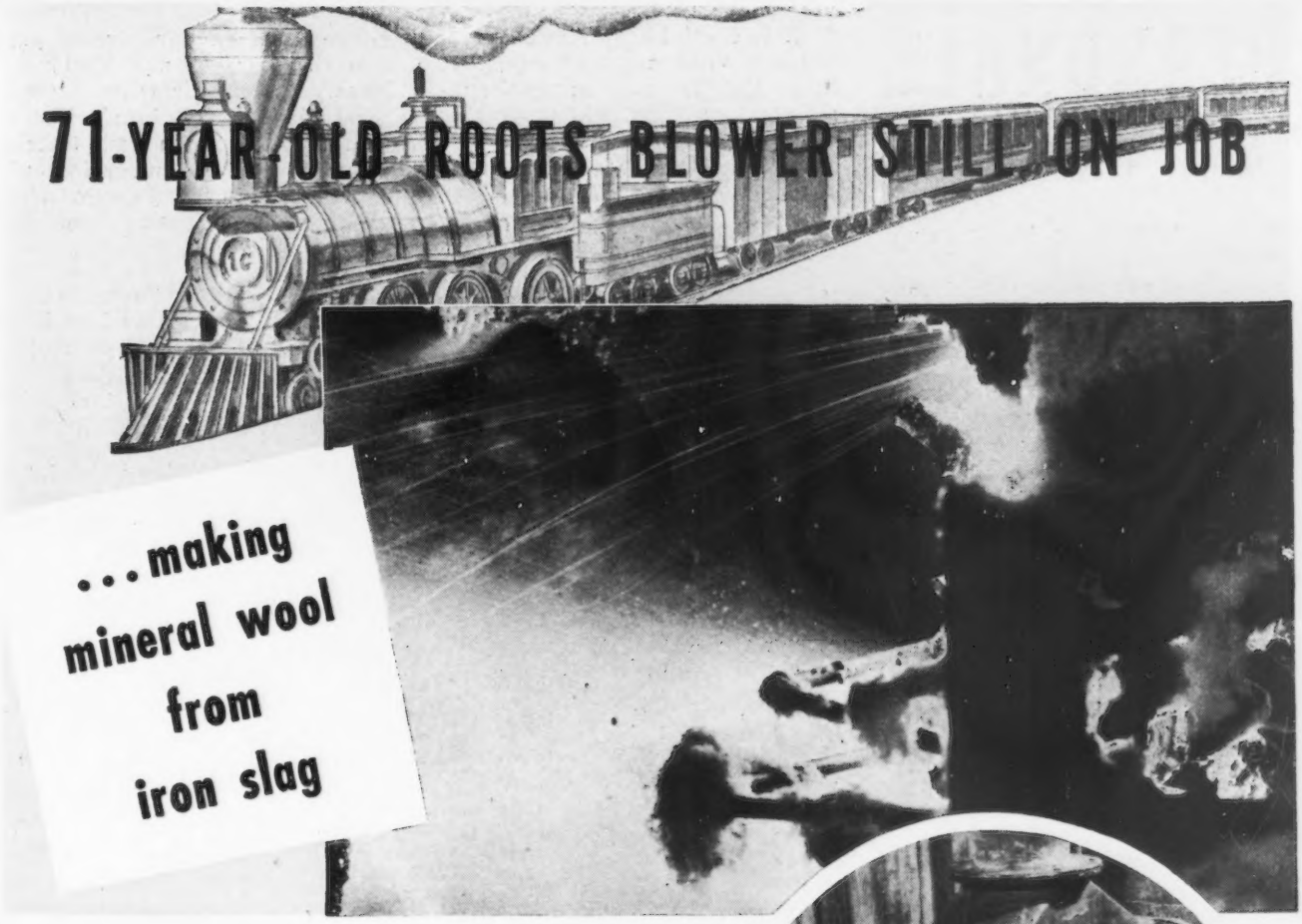
Paris

• • • **Only one blast** furnace of five at the Rumania state ironworks at Hunedoara is in operation at present and coke is being produced only at the Resitza works. A new coke plant is under construction at Lupeni which is expected to take care of most of Rumania's requirements in the future, using coal from the Jiu valley.

Some research has been carried on to evaluate the use of natural gas by the Sonafer company, and some success has been reported.

Immediate coke supplies are being arranged by the European Coal Organization, and 10,000 tons have recently been allocated from the British zone of Germany to Rumania. Transport will be via the Danube by way of Regensburg.

71-YEAR-OLD ROOTS BLOWER STILL ON JOB



. . . making mineral wool from iron slag

This cupola blower, fitted with wooden impellers, was installed in 1876 at the Stanhope (N. J.), plant of U. S. Mineral Wool Company (world's oldest manufacturer of mineral wool). Used in making mineral wool insulation from iron slag, it's still working faithfully, 24 hours a day, 7 days a week.

Amazing as this record is, we'll stack our modern blowers against it. Advanced engineering, new materials and methods make R-C Blowers better than ever before. Then, our *dual-ability* to build either Rotary or Centrifugal units permits matching the blower precisely to the job —for better all-round performance, economy and long life.

ROOTS-CONNERSVILLE BLOWER CORP.
706 Ohio Avenue, Connersville, Indiana

Insulation process completed by R-C Blowers

Air from compact, built-in R-C Blowers carries this same mineral wool into every nook and corner for building insulation. Similar units furnish air for widely varying uses—from ice-making to portable forges. High-capacity Rotary or Centrifugal equipment moves or measures air and gases in almost every industry, with a proved record for durability and economy.

You'll find it profitable to consult us on any problem of moving gas or air.

ROOTS-CONNERSVILLE BLOWER BUILDERS R-C SINCE 1854
ROTARY CENTRIFUGAL
BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS

★ ★ ONE OF THE DRESSER INDUSTRIES ★ ★

PERSONALS

o o o

• **W. C. Snyder, Jr.** has been appointed a vice-president in the engineering and construction division of Koppers Co., Inc., Pittsburgh. He succeeds the late John F. Byrne. Mr. Snyder had been president and general manager of the Lewis Foundry Machine Div. of the Blaw Knox Co. from 1937 to 1945. He then became president and general manager of the Continental Foundry & Machine Co., a position from which he resigned recently.

• **Hugh J. Fraser,** vice-president of the International Nickel Co., Inc., New York, has been placed in general charge of all plant operations of the company in the United States. **John A. Marsh,** assistant general manager of the Huntington, W. Va. works, has been appointed Mr. Fraser's assistant, with the title of assistant to the vice-president. Mr. Fraser, who has been vice-president of the company since March of this year, had been an assistant vice-president since 1943. He joined the Huntington works of the company in 1923, and was promoted to the New York office in 1935. Mr. Marsh became associated with International Nickel as a laboratory assistant at its Huntington works in 1928.

• **William P. Quinn** has been named superintendent of the steel finish department of the Pratt & Letchworth Co. Before joining the Buffalo company he was with American Steel Foundries in executive capacities at East St. Louis and Indiana Harbor.

• **E. J. Bredeson,** manager of the Chevrolet plant in Muncie, Ind., has been transferred to the central office manufacturing staff at Detroit.

• **John J. Mooney,** formerly executive assistant to the industrial relations manager at Packard Motor Car Co., has been appointed manager of employee relations for Dearborn Motors Corp., and **John J. Dzorni,** formerly with Nash-Kelvinator Corp., has been made manager of the company's distribution control division.

• **R. Herbert Knapp** has been appointed chief engineer of U. S. Steel Corp.'s coal mining subsidiary, H. C. Frick Coke Co., Pittsburgh. His services with the U. S. Steel Corp. started in 1943, when he was employed as assistant mining engineer of the H. C. Frick Coke Co. In 1945 he was promoted to mining engineer, the position he has held until his present appointment. His headquarters will continue in Uniontown, Pa.

• **R. C. Somerville has been** appointed general sales manager of the Plymouth Div. of Chrysler Corp., Detroit. He joined Plymouth in 1931 and was named director of regions in 1941. He handled special assignments in connection with Chrysler Corp. during the war. In 1944 he was named assistant general sales manager of Plymouth.

• **Joseph J. Duffy, Jr.** has been appointed manager of sales of the special chemicals division of the Pennsylvania Salt Mfg. Co., Philadelphia. Mr. Duffy, formerly assistant manager of sales in the division since 1945, assumes the position formerly held by William P. Drake, recently appointed assistant vice-president.

• **Thomas Penfield** has been appointed market analyst of the Crosley Div., Avco Mfg. Corp., Cincinnati. Prior to joining Crosley Mr. Penfield was research director of the Grit Publishing Co. for 3 years.

• **Alton A. Way** has been named acting manager of the Chevrolet Motor Div. plant of General Motors Corp. in Tonawanda, N. Y., in the absence of plant manager **Alfred G. Gulliver,** who has been on sick leave. Mr. Way formerly had been general superintendent of the plant and more recently had been on special duty at the Detroit offices of Chevrolet.

• **Frank Reese** has been promoted by the Monsanto Chemical Co. to lead the research mechanical development group at Springfield, Mass. Mr. Reese has been a group leader in charge of pilot plant operations in the plastics research division of the company. He joined Monsanto as a research chemist in 1941 and was placed in charge of pilot plant operation in 1944.

• **Frederick G. Lindstrone,** general superintendent, Palmer, Mass. plant, Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp., has been made district manager and will supervise subsidiary plants at Palmer, Worcester and Clinton from the Palmer office.

• **F. L. Ebersole,** formerly mechanical engineer, American Rolling Mills, Middletown, Ohio, has joined Loewy Construction Co., Inc., New York, as assistant chief engineer of the Rolling Mill Div.

• **J. C. Hurley** has been appointed manager in charge of original equipment sales for the Aro Equipment Corp., Bryan, Ohio. He will have headquarters at Detroit.

• **W. Fosh Dew** has been appointed sales manager of the Clearing Machine Corp., Chicago. Mr. Dew was formerly assistant sales manager for the Clearing organization, with which he first became associated in 1940.

• **Ralph V. Davies, Robert B. McKee,** and **Donovan Wilmot,** assistant general sales managers for Aluminum Co. of America, Pittsburgh, have been promoted to vice-presidents of the company. Mr. Davies will also become general sales manager for Alcoa, succeeding George J. Stanley.

• **Alfred T. Alden,** president of the Pacific Chemical Co. in Los Angeles from 1931 to 1946, has been appointed general sales manager of Ellinwood Industries, Los Angeles. **Robert S. Furst,** vice-president of the company and sales manager of the farm equipment division, Ellinwood Industries, Los Angeles, has resigned to establish his own business.

• **C. L. Peirce, Jr.** has been elected chairman of the board of Hubbard & Co., Pittsburgh, and **Joseph V. Smith** has been elected president of the corporation. Mr. Peirce was formerly president and Mr. Smith executive vice-president.

• **H. E. Swanson** has been appointed consulting engineer and director of research at the Unit Crane & Shovel Corp., Milwaukee. **E. F. Rueter** has been named to the post of chief engineer. Mr. Swanson joined the Unit organization in 1939; Mr. Rueter in 1944.

• **T. O. Armstrong** has been appointed director, plant labor relations, of Westinghouse Electric Corp. and will be located in the Pittsburgh office. Mr. Armstrong joined Westinghouse in 1927 as a clerk in the East Springfield plant. In 1935 he was named assistant supervisor of industrial relations. He was made supervisor of the department in 1936 and manager in 1942. **Clifford M. Sayre** has been appointed general works manager of the Sturtevant Div. of Westinghouse Electric Corp. In this position Mr. Sayre will direct manufacturing operations at the division's plants at Hyde Park, Mass., Camden, N. J., La Salle, Ill., and Berkeley, Calif. He goes to Hyde Park from Sunnyvale, Calif., where he was works manager of the Joshua Hendy Iron Works. The new works manager is returning to Westinghouse after an absence of 7 years.

• **John Engelsted** has been made works manager of the Union Twist Drill Co., Athol, Mass. plant. He has been assistant to Simon MacKay, general manager. **W. D. MacSkimmon,** superintendent of the drill department, has been succeeded by **Richmond MacKay.**

• **Henry W. Kayser** has assumed new responsibilities at the Falk Corp., Milwaukee, with his appointment as supervisor of development engineering. He has been associated with the Falk Corp. as designer, application engineer, and development engineer since 1931.

• **A. J. Kindig** has become associated with Webster Mfg., Inc., Tiffin, Ohio, and has been appointed plant engineer. Mr. Kindig was formerly with Dodge Mfg. Corp. in various capacities, and more recently served as general superintendent of T. B. Woods Sons' Co.

• **F. W. Mesinger,** vice-president of the Norma-Hoffmann Bearings Corp., Stamford, Conn., has been elected to the board of directors. He has been with the corporation 28 years and is in charge of sales.

• **William C. Thiess** has been appointed field service representative by Optimus Detergents Co., Matawan, N. J. He will cover Philadelphia and Baltimore areas. Mr. Thiess has recently been a member of the staff of Detrex Corp.

FRANK M. BEAUREGARD, vice-president in charge of operations, Mullins Mfg. Corp.

• **Frank M. Beauregard** has been elected a vice-president in charge of operations of Mullins Mfg. Corp., Warren, Ohio. He has been operating manager of Mullins' plants in Salem and Warren since 1946. He will continue to direct the company's manufacturing activities.

• **James B. Cook** has been appointed president and general manager of the Kloster Steel Corp., Chicago. Mr. Cook has been associated with the Kloster Steel Corp. for the past 18 years.

• **Frank L. Driver, Jr.** has been elected president of Driver-Harris Co., Harrison, N. J. **Stanley M. Tracy** has been elected executive vice-president and treasurer; **Ernest A. Harleman,** vice-president and secretary; **Harry D. McKinney** and **George A. Lennox,** vice-presidents; **Joseph B. Shelby** and **Francis E. Bash,** assistant vice-presidents; **Albert N. Knapp, Jr.,** assistant treasurer; **Joseph Kahrs,** treasurer pro tem, and **Mildred W. Clark,** assistant secretary.

• **Arthur Dressel** has been made senior vice-president of R. Hoe & Co., Inc., New York. He will also continue as sales manager.

• **Donald G. Forbe** and **Orville H. Tift** will staff the new Milwaukee office being opened by the Wico Electric Co.

• **C. L. Thompson, Jr.** has been appointed sales and technical adviser to David P. Reynolds, vice-president and sales manager, Reynolds Metals Co., Louisville. Mr. Thompson from 1943 to 1946 was assistant to the works manager and superintendent, industrial relations division for the Clinton Engineer Works-Tennessee Eastman Corp., and from 1946 until joining Reynolds, he was director, development branch, national housing agency and chief of the marketing section, Office of the Housing Expediter, Washington.

• **Julius J. Domonkos,** vice-president of Bell Aircraft Corp., Buffalo, and manager of the Burlington, Vt. Div., has been named vice-president of manufacture, and **Robert M. Stanley,** chief engineer, has become vice-president of engineering. **Charles L. Beard** has resigned as vice-president and director, and **D. Roy Shoults** has resigned as vice-president.

• **Edward F. Cahoon** has rejoined TelAutograph Corp., New York, as chief engineer. He assumes full responsibility for all technical activities and services. For the past 5 years, Mr. Cahoon, as development engineer, has been engaged in secret work being done by W. L. Maxson & Co. for the Navy.

• **Arthur L. Gardner** has been appointed assistant to the division general manager of the Monsanto Chemical Co.'s Merrimac division, Boston. Mr. Gardner was formerly production manager of the division.

• **B. E. Rogers,** former general superintendent of the U. S. Cartridge Co., has been appointed works manager of the Western Cartridge Co., division of Olin Industries, Inc., East Alton, Ill. Previously with Neiler, Rich & Co., and with Brunswick Balke, Collender Co., Mr. Rogers was more recently manager of the fabricating division of Western Brass Mills, another Olin enterprise. **W. M. Hurley,** veteran Western Cartridge Co. employee who, during the war, rose from chief inspector to assistant general superintendent of the U. S. Cartridge Co., has been appointed assistant works manager of Western.

• **Arch B. Kirkwood, Jr.** has been named district resident engineer of the Honan-Crane Corp., with headquarters in Buffalo. The company is a subsidiary of the Houdaille-Hershey Corp. Before joining Honan-Crane, Mr. Kirkwood was with American Lubricants, Inc.

• **Zolly C. Van Schwartz,** until recently chief machinery engineer, design, development and research with the Peck Stow & Wilcox Co., has been put in charge of standards department of General Machinery Corp., Hamilton, Ohio.

• **John W. Cruikshank** has been named to head the sales division of the Wingfoot Homes, Inc. plant at East St. Louis, a Goodyear Tire & Rubber Co. subsidiary. In assuming his duties, Mr. Cruikshank leaves the position of district manager for aviation products division in Buffalo. He has been associated with the Goodyear aviation products division since 1943.

• **N. H. Boynton,** who has served as general sales manager of the General Electric lamp department's western sales districts since 1931, will join the staff of the administration division at Nela Park, Cleveland, on July 1. **P. D. Parker,** general sales manager of the lamp department's eastern sales division since 1945, will become general sales manager of the general sales division in the new sales setup, and **F. J. Borch,** manager since 1940 of the lamp department's general service division comprising 16 service districts throughout the country, is appointed manager of the newly-created sales operation division, effective July 1. **D. A. Hopper,** who for the past 2½ years has served as manager of GE lamp department's Newark service district, will succeed Mr. Borch as manager of general service division. Other appointments are as follows: **J. A. Amport,** manager of St. Louis service district, has been appointed manager of Newark service district. **O. E. Bruton,** manager of Denver service district, has been appointed manager of St. Louis service district. **R. G. Weiland,** assistant to the manager at Atlanta service district, has been named manager of Denver service district. These changes, likewise, are effective as of July 1.

RUDOLPH FURRER, vice-president in charge of engineering, American Car & Foundry Co.

• **Rudolph Furrer** has been elected vice-president in charge of engineering for American Car & Foundry Co., New York. Mr. Furrer has served on the War Metallurgy Committee and as a special consultant in ordnance research and development. His earliest work was with the Allis-Chalmers Mfg. Co., where from 1907 to 1918 he was employed successively as machinist-apprentice, draftsman and designer of hydraulic machinery. In 1919 he became a member of the A. O. Smith Corp.'s engineering staff and served as designer, supervisor of construction, purchasing engineer and in 1925 as chief engineer. In 1933 Mr. Furrer became associated with U. S. Steel Corp. as assistant to vice-president of one of their subsidiaries. He succeeds **Edmund D. Campbell,** former vice-president in charge of engineering, who recently retired after being with ACF since 1904.

• **Arthur E. Marsan,** previously on the research staff of Solar Mfg. Corp.; **Eleanor G. Sheridan,** a chemist formerly with the Container Corp. of America; **Helen L. Robison,** a chemist formerly with Wilmington Refinery Div. of Shell Oil Co. at Los Angeles, and **John C. Elliott,** formerly of the Medi-Synth Laboratories of Los Angeles, have been added to the staff of the Bjorksten Research Laboratories of Chicago.

• **Randolph J. Roshirt** has been appointed general manufacturing manager of the Bohn Aluminum & Brass Corp., Detroit. He will have charge of all manufacturing in the corporation's 14 plants. He joined the Bohn organization in 1919 and since 1935 has been in direct charge of all foundry production.

• **Robert G. Calton,** who has been executive vice-president of Tennessee Enamel Mfg. Co. for the past 18 years, is joining the sales staff of Chicago Vitreous Enamel Product Co., Cicero, Ill, July 1, to work with enameling plants in the southern territory. **Wesley L. Dinsmore** has also joined the Chicago Vit organization in the capacity of service engineer. Mr. Dinsmore was associated with the Beneficial Management Corp. for 5 years. In 1942 he joined General Electric Co., River Works, Lynn, Mass. He worked in the aircraft gas turbine division and spent 3 years on special assignments. **William L. Donaldson,** who has been associated with the Geo. D. Roper Corp., is now a member of the Chicago Vit service organization, having joined the company June 1.

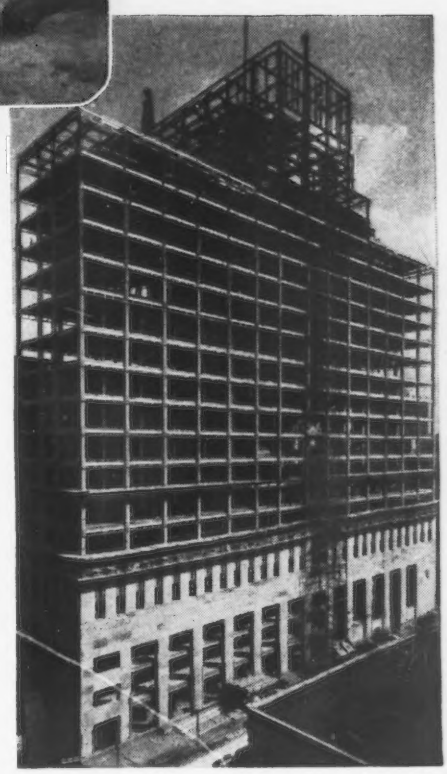
• **Eugene L. Craig** has been named sales manager for the International B. F. Goodrich Co. in the territory of Hawaii. He will have headquarters in Honolulu and have charge of the sales of all the company's products in the Hawaiian Islands. He joined the B. F. Goodrich Co. in 1936.

• **William G. B. Euler,** vice-president of Pacific Gas & Electric Co. in charge of operations, will become vice-president and general manager of the company on July 1, to succeed **A. Emory Wishon,** who will become executive vice-president. **R. E. Fisher,** vice-president in charge of public relations and sales, has retired after 36 years of service. **Norman R. Sutherland,** manager of the company's San Francisco Div. since 1945, has been named to succeed Mr. Fisher. **Dunlap D. Smalley,** engineer of electric operation, will succeed Mr. Euler as vice-president in charge of operation. **James S. Moulton,** executive engineer, has been appointed vice-president and executive engineer. **I. C. Steele,** chief engineer, has been appointed vice-president and chief engineer.

(CONTINUED ON PAGE 104)

Cameron Iron • Peterson Bros.

Both use SMITHway *Certified* Electrodes



Cameron Iron Works, Houston, manufactures drilling, completion control equipment, and other specialties for oil-field use, including the Cameron Blowout Preventer, a part of which is pictured. SMITHway SW-15 Electrode is shown in use. Cameron, which also uses many SMITHway high tensile electrodes, knows that the *proof* of SMITHway Electrodes is in production—and in service.

Peterson Bros. Construction Co., Houston, steel erectors, used SMITHway Electrodes throughout in welding the new City National Bank Building, Houston. The first four floors were welded with SW-15, all the other floors with SW-10. Peterson Bros., too, know the value of A. O. Smith welding research . . . research that makes welding the modern tool for *all* kinds of jobs, both large and small.

SMITHway *Certified* Welding Electrodes—Made *by* Welders . . . *for* Welders

ASK FOR THE FACTS ON SMITHway A. C. WELDERS!

Models for every kind of welding job—cover every welding range. Lightweight, compact, highly efficient. Write for specifications and prices.

A. O. SMITH Corporation

NEW YORK 17 • PHILADELPHIA 5 • PITTSBURGH 19 • CLEVELAND 4 • ATLANTA 3
CHICAGO 4 • TULSA 3 • MIDLAND 5 • DALLAS 1 • HOUSTON 2 • NEW ORLEANS 18
SEATTLE 1 • SAN FRANCISCO 4 • LOS ANGELES 14
INTERNATIONAL DIVISION: MILWAUKEE 1

Dear Editor:

ALUMINUM ALLOYS

Sir:

With reference to the paragraph in the Newsfront of the May 22 issue mentioning: "In desperation, a prominent consulting aircraft engineer searching for information on proportional limit values of aluminum alloys went to the largest technical book store in Chicago and offered to buy every book in stock that even mentioned the subject. He couldn't buy a single book. Neither have the producers been able to supply him with any data," please note that I have a German reference book dealing with aluminum, and which contains a number of pages giving full particulars regarding the physical properties of a considerable number of alloys manufactured in 1936, in Germany and other countries. If the party you mention is interested in this book I will be glad to lend it to him for the purpose of making photostats of the pages in which he is interested, although I would not like to part with the book otherwise.

R. W. DEIMEL
F. Schmutzer
New York

● Thank you, Reader Deimel, for your generous offer. We are forwarding your letter to our Chicago editor and perhaps he can help out the friend who has been having trouble on aluminum alloy properties.—Ed.

THE ONE-WAY DOLLAR

Sir:

The last sentence of Mr. Lippert's editorial, "The One-Way Dollar," is a gem. In fact, the entire editorial is a piece of hard-hitting, common sense reasoning and writing which is most gratifying . . .

VERNON E. BUNDY
Special Assistant to the Chief
Div. of Commercial Policy
Dept. of State
Washington

Sir:

Mr. Lippert's editorial on foreign trade, particularly his last sentence, goes right to the crux of the problem.

AVERELL HARRIMAN
The Secretary of Commerce
Dept. of Commerce
Washington

Sir:

I have read the editorial appearing in the May 29 issue of THE IRON AGE with great interest.

ROBERT A. TAFT
U. S. Senate
Washington

ATOMIC HYDROGEN WELDING

Sir:

We have read in the May 8 issue the article, "Atomic Hydrogen Welding of Stainless Sheet," in which we are very much interested since we have many cases of welding of stainless steel and require to use this welding. It would be appreciated if you would inform us of the name of the firm who sells the welding torch referred to in the same article . . .

ERNESTO VIEIRA DE MENDONCA
Manager
Sociedade Equipamento de Escritorio, Lda.
Lisbon, Portugal

● Further information can be obtained from the General Electric Co., Thomson Laboratory, Lynn, Mass. They manufacture the welding torch described in the article.—Ed.

VERY POPULAR ITEM

Sir:

We noticed a news item on p. 55 of the May 22 issue as follows: "A new wrinkle in brazing carbide tool tips is a silver alloy paste that begins to melt at 480°F and is said to protect both the carbide tip and the steel joint area with a liquid protective film before the heat generated oxides can form. The new paste is merely painted on the prepared joint surfaces." We are very much interested in this material and will appreciate if you would advise the name of the manufacturer so that we may contact them.

H. M. STEADMAN
Purchasing Agent
National Supply Co.
Torrance, Calif.

● Sherman & Co., 197 Canal St., New York 13, manufactures this product.—Ed.

PLASTIC SAFETY GOGGLE

Sir:

In the Mar. 4 issue in Newsfront, there appeared reference to a new plastic safety goggle which was said to be able to stop a sharp piece of steel flying at 240 mph. Can you tell us who has developed this goggle, and if it is on the market yet?

M. STEUTEVILLE
M. L. Samson Co.
Chicago

● The goggle is the product of U. S. Safety Service Co., 1215 McGee St., Kansas City 6, Mo. We understand the goggle is now on the market.—Ed.

INDUSTRIAL MANAGEMENT

Sir:

At the present time we are compiling the material for our 1947 Industrial Management Symposium, a volume we have published annually for many years, consisting of articles and discussions by prominent authorities on topics of timely interest relating to industrial management and supervision. We understand that in the Aug. 1, 1946 and Sept. 26, 1946 issues there appeared respectively, articles, entitled "Training Time Study Men," and "Blueprint for Sound Labor-Management Policies." We would like to include either or both of these articles in our Symposium, and accordingly if you will give us the necessary permission and send us copies of same, we will appreciate it very much. In using your material, we will state that we are doing so through your courtesy.

JOHN J. MURRAY
General Manager
Consolidated Reporting Co.
New York

● We are only too glad to give you permission to republish the articles you mention, giving credit to THE IRON AGE. We are sending a copy of the article "Training Time Study Men." "Blueprint for Sound Labor-Management Policies" did not appear in our magazine.—Ed.

TRADE NAMES

Sir:

A copy of the "Directory of 10,000 Trade Names" will be greatly appreciated for official use in the Bureau of Mines.

NEILSEN B. O'REAR
Bureau of Mines
Washington

● The directory is now available to subscribers at a cost of $3.00 each for one or two copies; $2.50 each for three to nine copies; and $2.00 each for 10 or more copies. Your copy has been forwarded.—Ed.

BOLTS AND NUTS

Sir:

. . . If you will refer to p. 128 of the Jan. 16 issue you will see Bolts and Nuts listed as a "percentage off list." What we would like to know is what this "list" is, and would it be possible for us to receive a copy?

L. A. SMITH
Secretary
Ajax Bolt & Rivet Co., Ltd.
Lower Hutt, N. Z.

● Our quotations refer to a discount from price lists for bolts and nuts of the various large manufacturers. We are forwarding names and addresses of several of the larger companies that we believe will be able to supply you with satisfactory lists so that you will be able to make use of our quotations.—Ed.

SURPLUS MACHINE TOOLS

Sir:

We would be obliged if you would kindly help us to obtain information about the War Assets Administration. We would like to get two catalogs advertised by WAA in your issue of Apr. 17 in order to pick out machines and buy them direct from the WAA offices or through an approved dealer.

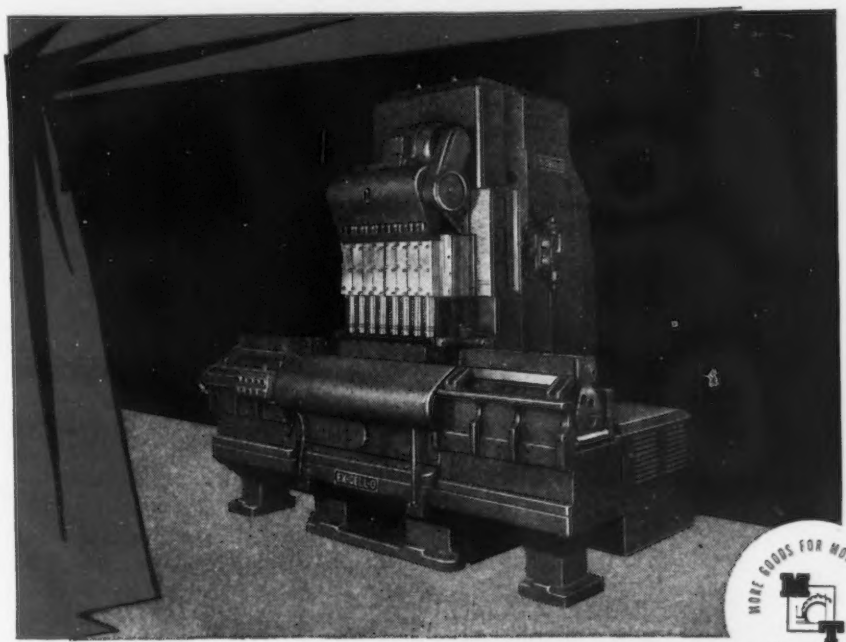
JAMES PICANOL CAMPS
Vice President in Charge of Research
Metiers Automatiques "Picanol"
Ypres, Belgium

● We have asked the New York office of the WAA to send you a copy of their newest catalog which includes the most recent listings of equipment available for sale.—Ed.

PREVIEW

of EX-CELL-O's Modern Machines as featured at the MACHINE TOOL SHOW

(Dodge-Chicago Plant . . . Sept. 17-26 . . . Booth 518)



EX-CELL-O CYLINDER BORING MACHINES

Boring as a method of precision machining automotive cylinders is a pioneer development by Ex-Cell-O. Here is shown the latest Ex-Cell-O machine of this type, Style 66 Vertical. Can be used also for boring holes in other parts where accuracy of roundness and straightness is required. *See it at the Show!*

MORE GOODS FOR MORE PEOPLE AT LOWER COST

NEW IMPROVED THREAD GRINDER

This new Ex-Cell-O Style 35-A Precision Thread Grinder is hydraulically operated and electrically controlled. Accommodates single or multi-rib wheels, with diamond dressers or form crusher. Leads from 1 to 128 threads per inch obtained with standard change gears. *See it at the Show!*

Automatic TOOL GRINDER

Designed for fast conditioning of straight faces of carbide-tipped, stellite, and high speed steel cutting tools. Ex-Cell-O Style 40 Automatic Grinder is extremely economical for the conditioning of varying quantities of identical tools. *See it at the Show!*

XLO

EX-CELL-O *for* PRECISION

47—26

EX-CELL-O CORPORATION

DETROIT 6 MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CONTINENTAL CUTTING TOOLS • MISCELLANEOUS PRODUCTION PARTS
FUEL INJECTION EQUIPMENT • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • DAIRY EQUIPMENT

Industrial News Summary...

- ***Wildcat Coal Strikes Hit Steel***
- ***Stocks Reaching Dangerous Level***
- ***Scrap Market Grows More Jittery***

WILDCAT shutdowns at steel company captive mines this week in advance of the miners' vacation period will cut coal supplies for the industry to a dangerously low point. How far the decline will go is unimportant compared with what will happen if there is a nationwide coal strike on July 7, when the vacation period will officially be over.

While many steel plants had been able to build up some coal supplies, the high operating rate has been a continual drain on these stocks and the 10 to 11-day shutdown now in progress will force some of the larger units to take off blast furnaces. A general strike in the mines on July 7 would force a large segment of the industry to take precautionary plans and sharply cut back steel production in order to conserve supplies.

There are still many in the industry who cling to the hope that the United Mine Workers will not test public opinion again with another major strike. Some sources insist that a prompt meeting of minds between John L. Lewis and the coal operators could result in a firm contract "within an hour's time." When negotiations were cut off recently both sides were far apart on wage issues. What the government can do under the new labor law to prevent a coal strike is still uncertain.

•

IT APPEARS that the basic steel contracts which reflect excellent labor relations between the steel companies and the union are, according to makers of the new labor act, frozen at least until July 1, 1948. Before that time, however, it is believed that the steel companies and the union must reopen their contracts —which they had believed would run for 2 years— and make new agreements on the checkoff and union shop provisions known as "maintenance of membership" in the steel contracts. This information was obtained by THE IRON AGE from sponsors of the new labor bill. The current act, it was said, specifically requires that its provisions with respect to the checkoff and the union shop to be in force as of July 1, 1948.

The scrap markets throughout the country this week are more jittery than at any time since early this year when prices reached all-time peaks. There were indications that the rush for material by some steel consumers had assumed almost frenzied proportions. There is evidence that some large consumers have been raiding each other's territory for additional scrap in the Midwest and in the Southwest. Whether this hysterical activity will turn towards the East remains to be seen, but already the Philadelphia market is rapidly approaching its recent peaks.

With No. 1 heavy melting steel up $1 a ton in Pittsburgh and $3.50 in Philadelphia, THE IRON AGE steel scrap composite price has jumped $1.50 a gross ton this week. The new figure is now $34.75 compared with $33.25 a gross ton a week ago. There is evidence in the Chicago district that the stronger scrap prices are not necessarily due to the threat of a coal strike. Buyers in that area are fearful of inroads being made by distant consumers. This reflects the general scrap shortage throughout the country due to the unusually high steel operating rate.

Steel ingot output this week is down a half a point to 96 pct of rated capacity. Some decline is expected next week as steel mills make allowance for diminished coal supplies. Activity over the next few weeks will be extremely vulnerable because of the general labor unrest.

MAJOR attempts by steel producers to bring about an easier steel supply situation by high activity have received a severe setback for the time being. Consumers who had made up their minds to cut down on fresh orders will now exert pressure for delivery of all steel possible because of the gloomy outlook.

There was no indication this week that steel consumers clamoring for flat-rolled products would find supplies any easier before next year. About the only products which could be had in a reasonable time were tool steels, wire rope, cold-finished bars and floor plate. There was an indication this week of an easier market trend in manufacturers' bright wire. Stainless steel demand has picked up recently, especially for light gage polished stainless sheets.

Some steel consumers are not satisfied with the steel industry's insistence that there is enough capacity to meet current demand. Some customers agree that ingot capacity appears sufficient but that finishing capacity is so unbalanced that users of flat-rolled steel are not receiving the kind of treatment which they think they should be getting. Steel officials point out that when current expansion programs for flat-rolled material are completed, the country's needs will be met with the present ingot capacity. Other consumers are extremely vocal over the disappearance of large tonnages of hot-rolled sheets from the market and claim that this situation has nothing to do with capacity but is an arbitrary product mix chosen by producers in order to sell higher priced cold-rolled material. Steel producers claim that the increase in cold-rolled steel sheets represents a technological change in the industry.

Control of consumers' inventories continues unabated this week. Manufacturing plant shutdown periods will enable officials to attempt a better balancing out of current inventories. Some stocks, however, have been forced on the open market by banks who have ordered inventory sold as a prerequisite to securing additional credit. This trend, started in the soft goods lines, has invaded the metalworking industry.

• **ORE USE UP**—Consumption of Lake Superior district iron ore by U. S. and Canadian blast furnaces rose to 6,884,803 gross tons in May, bringing cumulative consumption in 1947 to 33,730,770 gross tons, according to the monthly report of the Lake Superior Iron Ore Assn. Gross tons of iron ore on hand at furnaces and Lake Erie docks totaled 17,618,341 on June 1, as compared with 13,554,803 tons May 1, and 23,904,998 tons June 1 1946, the report showed. Active blast furnaces depending principally on Lake Superior ore numbered 166 in the United States and 8 in Canada, June 1. Idle furnaces numbered 17 in the United States and 2 in Canada.

• **BRITISH OUTPUT**—British steel output figures for May show that production held up well last month in view of the difficulties. Output of steel ingots and castings was at the annual rate of 12,684,000 long tons. This figure compared with 13,619,000 tons in May 1946, so that there is still a lot of leeway to make up. Nevertheless the May annual rate was up on April when it was 12,294,000 tons. The figures still reflect the effect of fuel limitations generally. Pig iron output in May was at the annual rate of 7,378,000 compared with 7,238,000 tons in April and 7,860,000 tons in May 1946.

• **WORK WEEK**—The average manufacturing work week dropped to 40 hr in April, according to preliminary estimates of BLS, while the hourly wage rate continued to rise. The weekly earnings, however, dropped slightly. The March worker in iron and steel and their products received $51.32 for 40.4 hr as compared with the nonferrous metals and their products worker who received $50.28 for 41 hr.

• **NEW COLD DRAWER**—A cold drawing plant is nearing completion at the Briar Hill works of Youngstown Sheet & Tube Co., Youngstown, Ohio. This unit will cold draw bar sizes. Initially the bars will be consumed by Youngstown for its own use. As soon as production can be fully expanded the company plans to market most of the output to the trade as a regular product.

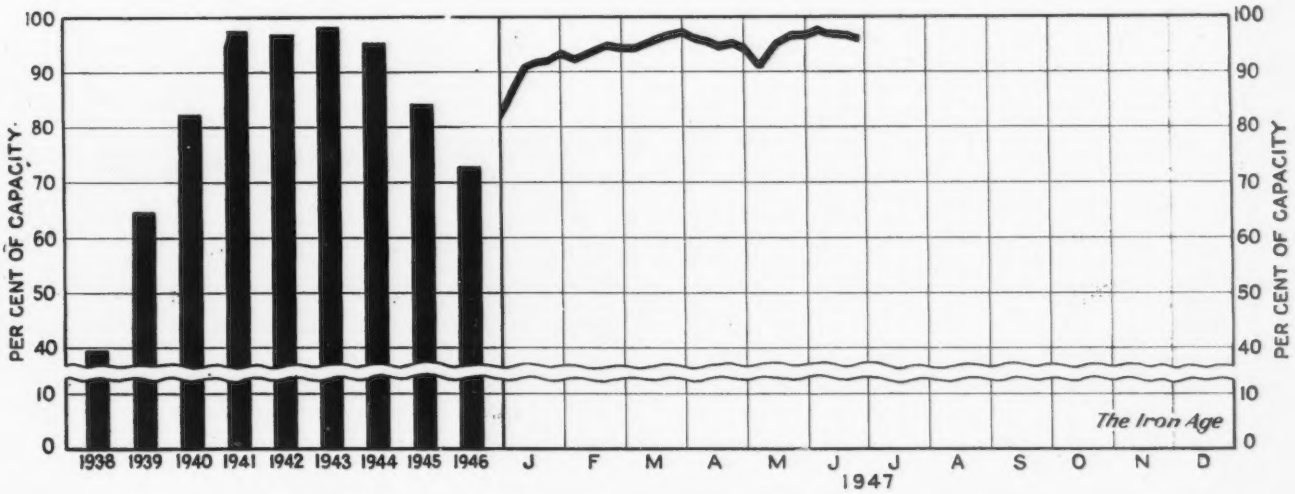
• **THE STEEL SALES DOLLAR**—The steel industry's costs of production consumed 94¢ of each dollar which the industry received from sales in 1946, according to the American Iron & Steel Institute. After meeting those costs, all that remained of each dollar of sales was 6¢, which was divided as follows: 3¢ for dividends to stockholders; ½¢ for interest to bondholders and 2½¢ left in the business as a reserve for future needs. Payrolls took a larger share than ever before, according to an analysis of data reported by a large group of representative steel companies. The employees' share of the dollar was 41¢ in 1946, compared with 40¢ in 1945 and 35¢ in 1940. Materials and supplies, in which the indirect labor cost is large, required 40¢ of the sales dollar in 1946; taxes took 5¢; selling and administrative costs 4½¢; depletion and depreciation 3½¢. Federal taxes on income continued to be the largest of the taxes, absorbing 2½¢ of the 5¢ paid for taxes. In 1945 federal taxes on income were equivalent to 2¢ of the sales dollar.

• **CAR REGISTRATIONS**—New car registrations for May are estimated at 230,000 by R. L. Polk & Co., Detroit. Passenger car registrations in all states during March were 264,714. The indicated total for April is 250,000 new cars registered. Polk predicts that by the end of April the automotive industry will have registered nearly a million new cars.

• **POSTPONE LESS CARLOAD INCREASES**—New freight rates applicable to less than carload lots in official territory scheduled to go into effect on June 20 have been suspended by the Interstate Commerce Commission until Jan. 19, 1948.

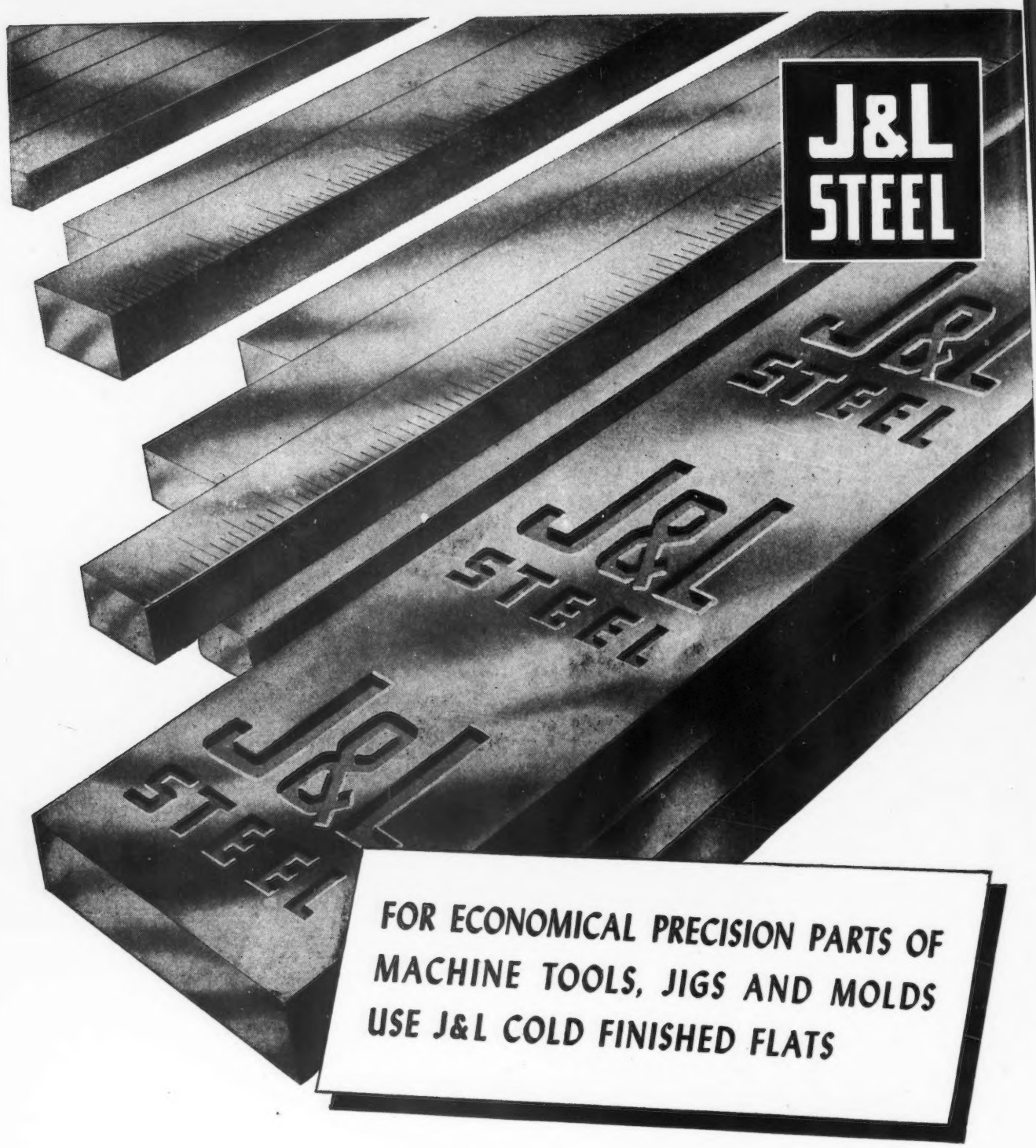
• **PLANT SHUTDOWNS START**—Worth Steel Co. will close down its entire plant and office for a one week vacation starting on June 27. Foundries in eastern Pennsylvania that are also closing down for this period include Eastern Malleable Iron Co., Wilmington, Del. and Naugatuck, Conn., American Brake Shoe Co., New Castle, Del.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
June 17.....	102.5*	96.0	92.0	96.0	97.0*	102.0	100.0	99.0	100.5	103.0	98.0	84.0	95.0	96.5
June 24.....	102.5	96.0	92.0	93.0	92.5	102.0	100.0	99.0	101.0	101.0	98.0	84.0	74.0	96.0

* Revised.



The size accuracy, surface finish and improved physical properties of Cold Finished flats make them applicable for many uses without extensive machining. They are economically made into slides for machine tools, parts for jigs and fixtures and molds for rubber and plastic. J&L Cold Finished flats are available in a variety of grades—in sizes from 6" to 15" from your nearest J&L Warehouse or distributor.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Oil Shortage Hysteria Generated by Prospect of Real Shortages

New York

• • • **The shortage** of fuel oil looming on next winter's industrial horizon is not a figment of the imagination but many well-informed observers say it doesn't deserve the hysteria now being generated. Many mills and manufacturing plants are now running into spotty shortages. Next winter will be worse, all sources agree, and indications are that bunker C (No. 6), the steel industry's openhearth fuel, will be the hardest hit.

The bunker C fuel oil shortage has been serious for almost a year. See THE IRON AGE, *Aug. 8, p. 106.—Ed.*

It is still 60 days too early, according to an oil company spokesman, to attempt an accurate evaluation of the situation. After fuel oil tanks are filled in September and the level of industrial operations is known, some accurate predictions can be made. Unfortunately, in sizing up the problem the biggest unknown in the equation —weather—must remain unknown. Planning will therefore have to be predicated on the assumption that it will be no worse than last winter's.

While there is little hope expressed by oilmen for any improvement during the coming winter, it is believed that some easing in supplies should appear in about 18 months. Large suppliers of refinery equipment, facing a shortage of everything from plate to steel forgings, have record orders on hand. A spokesman for one of the largest of these firms said it would be 18 months before any noticeable impression was made on backlogs. At the present rate of industrial activity, therefore, it appears that the winter of 1948-49 will see the turn for the better in fuel oil supply.

It is suggested that the industrial fuel oil user can best size up the possible effects of the shortage on his operations by weighing its causes and the steps being taken to whip those few which can be corrected.

American Petroleum Institute figures show that there is no basic shortage of crude oil. Production is currently topping 5 million bbl daily and setting all-time records. But the following factors, said to be responsible for the "shortage," show it to be fundamentally the same as that existing in steel: High rate of industrial activity; increased use of diesel locomotives; gasoline motor consumption 15 pct above 1946, 6 pct higher than the prewar peak; more home oil burners (500,000 more are projected for 1947 installation). Also: Conversion to oil for standby; distribution problems; increasing military demand; (6 pct of total output); the refinery trend to the catalytic process which makes gasoline a more profitable product; and shortages in materials to expand refinery output.

Transportation and Refining Problems to Be Major Hurdle This Year

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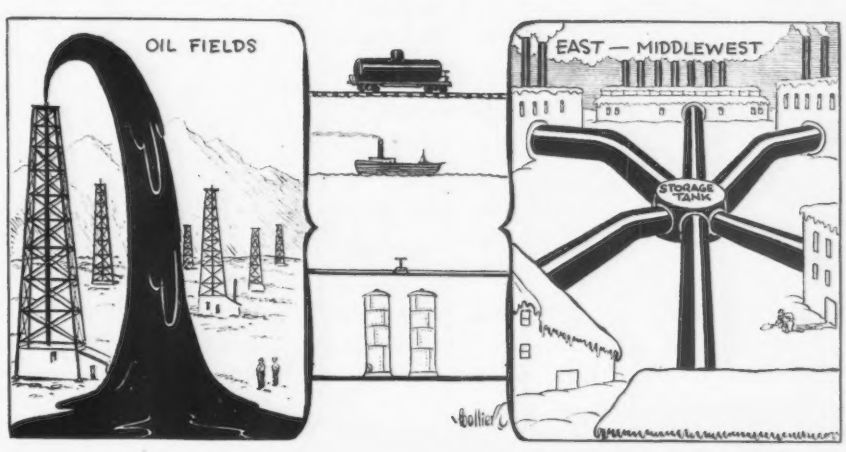
Among the factors cited by oilmen that may tend to improve the outlook the most promising is the possibility of more efficient utilization of present facilities. This will include refinery operation at above theoretical capacity; quicker turnaround of oil carriers and efforts to produce, ship and store as much fuel as possible during the off-peak summer months.

Tending to lend an additional ray of hope, particularly in the heavier grade fuels, is the fact that foreign oil sources are being steadily expanded. This is providing additional imports and also reducing the drain on American oil supplies.

Some company distribution policies will particularly benefit industrial users who are year-round purchasers of oil for steelmaking, annealing, heat treating, etc., by placing them first on the list of customers to receive their normal allotment of next winter's supplies. Second on the list of these producers will be those with normal winter demands; third will be those who normally use natural gas, with oil for standby. Other large oil companies have said, however, that they will not use this formula but will take care of "all regular customers."

In the face of increasing demands from most "regular customers" plus the inevitable new and potentially good consumers, it is believed that there will not always be enough to go around. Industrial concerns that take advantage of off-peak gas rates during the summer and switch to oil when winter comes may not fare too well, according to reports from Detroit where such consumers have been told by their oil company that they'll get no fuel oil this winter.

Winter Wonder-Land



WASHINGTON WORRIES: *Last week Secretary of the Interior Julius A. Krug called a meeting of cabinet members and government agencies at which the spotty oil supply picture was pointed up. Left to right, Secretary Krug, Undersecretary of the Navy, John L. Sullivan and Max W. Ball, Director, Oil and Gas Div., Interior Dept.*

Individual attempts to guard against a cutoff in fuel oil are meeting with limited success. It is known that several steelmaking and metalproducing companies have been able to install tanks to hold a 20 to 30 day reserve, and these will take the load of some distribution facilities this winter. Others, like Allegheny Ludlum, have put in propane plants for standby. In Detroit, several Chrysler and General Motors plants have liquid petroleum gas plants, which in some cases is the major source of supply for industrial processing.

A shortage of high pressure tank cars to transport liquid petroleum gas is reported to have restricted some changeovers and other firms report that their planning in this direction has been clouded because adequate supplies of propane and butane could not be assured them.

Some large users, notably Ford Motor Co. and Great Lakes Steel are arranging to use as much coal tar as possible in place of fuel oil to fire their openhearths. It is known, however, that both these plants will be hard hit if a fuel oil shortage develops in Detroit this winter.

Behind the oil industry's efforts to cope with the current shortage lie its plans for expansion of refineries, pipelines and other distribution media, including storage facilities. Pipe and pipe fabricated from plates have loaded steel mill schedules through 1948.

Most steel mills are taking care of their regular customers. Their allotments are certain for the coming months and one company has made commitments for line pipe as far ahead as 1950 and 1951. Casing and drill pipe are in very short supply; producers are doling it out in lots far smaller than actual needs.

Orders for pipe fabricated from plate have filled available mill space easily through 1948. Consolidated, on the West Coast, A. O. Smith Co., and National Tube Co. are constantly fighting for more plate for pipelines. Some mills are shipping ingots to the tube companies to further step up pipe production. It is estimated that about 200 miles of pipe a month are being fabricated from plate, the bulk going to domestic pipeline companies. If plate were available the amount might be boosted 50 pct.

Aside from the materials problem faced by the oil refineries, there is also the question of the economics of producing fuel oil. Oilmen report that there has been a marked trend in recent years to the catalytic cracking progress. It is reported that under this process it is more profitable to recover gasoline from crude oil than it is to stop at, say, No. 6, the oil used largely in firing openhearths.

It would be most profitable for oil producers to use this process to secure the maximum of 70 pct gasoline from oil. However no Eastern refiners are following this practice, according to reliable sources. Instead, eastern oilmen report that the degree of refining is determined by contract requirements for the different grades of oil products.

The petroleum industry plans to spend $2 billion a year for the next 2 years for plant expansion, according to William R. Boyd, Jr., president, American Petroleum Institute. This total is more than 22 pct of the $18 billion capital investment of the oil industry.

According to Mr. Boyd, about $2 billion of the expansion funds will be spent on increasing production of crude, include exploration and acquisition of oil lands. Slightly more than $1.1 billion will be spent on additional refining facilities. About $480 million will be put into expanding transportation facilities and the balance will go for miscellaneous items. These estimates, Mr. Boyd said, are based on a survey of companies which have actually budgeted outlays for the 2-year period in excess of $3 billion.

Another factor which is currently disturbing oilmen is the fear that the Maritime Commission's authority to use tankers, due to expire June 30, may not be extended. Dire results are predicted if this happens.

In Pittsburgh the oil supply problem is complicated by the threat of natural gas shortages. Many plants which were shut down by the gas shortage last year have converted to standby oil furnaces. The gas companies have recommended this equipment although many small plants are not making the change-over. In any event a bad winter will produce a gas shortage and thereby intensify the oil shortage in the Pittsburgh district.

Eastern Pennsylvania steel mills are very much concerned over the impending fuel shortage which as long ago as last summer was so bad that one major oil supplier discontinued selling bunker C fuel oil to mills in this area. Another large producer is now reported to be ready to discontinue supplying some of its consumers in the area when present contracts expire.

Practically every steel mill in eastern Pennsylvania is largely oil fired, and in most instances it would be impossible or very expensive to convert to coal firing.

Mill managements are reported as baffled by the problem presented by the uncertain future of their fuel supplies. At least one producer, however, has in progress a program of expended storage capacity, which will increase former capacity by four to five times. Despite this precaution, the mill is not certain whether it can obtain an oil supply to fill the enlarged capacity.

In the Midwest the shortage is expected to hit hardest and it would not surprise observers if there were occasional disruptive fuel oil shortages. Demand here has increased considerably due to the tremendous growth in railroad diesel programs, and distribution facilities are not adequate to properly serve this area.

Detroit, it has been predicted, will probably go through the winter without shutting down for lack of natural gas, but observers are not that optimistic in regard to fuel oil. The Detroit fuel oil shortage is aggravated by the fact that Michigan oil well output has been falling off for several years. Local companies are said to be getting less than half as much Michigan oil today as they bought a few years ago.

Russia Dominates Chinese Tungsten Market as Lone Customer

U. S. Government Stockpiling Policy Hangs Over Ore Market as Threat

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By JACK R. HIGHT
Associate Editor

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New York

• • • **Reports from** Washington of a further sale of 4000 tons of Chinese wolframite to Russia tend to strengthen the conviction of many observers that tungsten ore and ferrotungsten prices in this country are due to continue their upward spiral. Russian activity in the Chinese market, prewar supplier of 45 pct of the world's supply, has contributed to the progressive rise in the price of ferrotungsten in this country from $1.88 per lb in 1946 to $2.25 at present.

Further increases in tungsten will doubtless be reflected in the price of 18:4:1 tool steel. Tool steel prices have already gone up from a base price of 67¢ per lb in 1938 to 72.5¢ last year and 74¢ this year, and additional increases are expected. Some reflection of these prices is expected in the pattern of consumption, as some users may choose to change from 18 pct tungsten tool steel back to the wartime substitute containing 6 pct tungsten and 6 pct molybdenum.

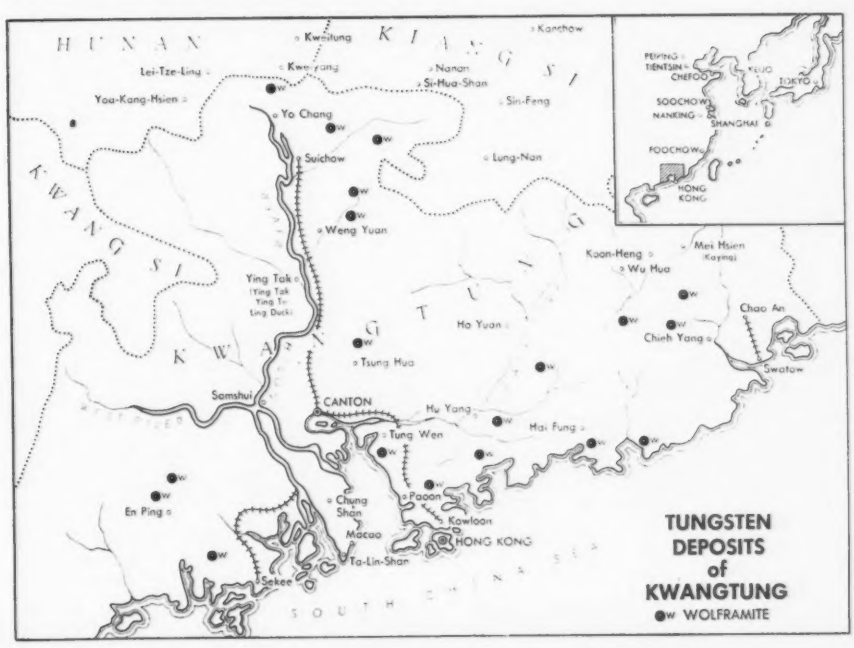
Latest reports indicate that 3500 tons are included in the most recent contract with Russia for Chinese tungsten ore to be shipped via Shanghai. The Chinese deposits are located in the South, in Nationalist territory, but the shipments today stem back to an arrangement made during the war when the Burma Road was closed.

Despite Communist Russia's dislike of the Chiang Kai-shek regime, Stalin came to China's aid during those perilous days with 300 fighter airplanes—more helpful spiritually than materially—but three hundred more than the United States was able to furnish at that particular time. According to informed sources, these airplanes were released on an agreement for future deliveries of tungsten, but on a cash basis.

Also during the war, the U. S. government loaned to Chinese nationalist government $20 million against the future delivery of tungsten. Only a small part of this has been repaid. Against this pattern of history the cynics in the market outline the most materialistic explanation of the present Chinese selling position. They explain that with reduced Chinese production, the government tungsten monopoly is choosing to sell to Russia for cash—reportedly the latest sale was at a Shanghai price equal to $38 per unit—rather than ship to the United States where payment would be subject to being offset against the loan.

Whatever the motive, it is certain that the Chinese monopoly is not in the market as far as the U. S. is concerned, and some sources have estimated that no more than 200-300 tons of Chinese ore will find their way to the U. S. this year. Some small tonnages

TOOL STEEL STARTS HERE: *Contrary to some popular opinion, the Nationalist territory in South China is the tungsten mining area.*



of Chinese ore are finding their way here, smuggled through Hong Kong. These unofficial operations are presumably subject to direct dollar payment, and thus may not be too heartily discouraged by the Chinese government.

Production difficulties are plaguing the Chinese government organization. Most output comes from small mining operations, and the price which the government pays for the ore is very low in inflation-ridden China. With the pay from the government so low, most of the miners have quit work, and show few signs of going back until the government can achieve some kind of financial stability.

Official sources indicate that assuming a continuation of today's low production, it will take China another year or possibly two to work off its present commitments to Russia.

Reports have also been printed indicating considerable Russian activity in tungsten from other parts of the world. No complete explanation has been made of the activity of brokers in London in tungsten ores, but some of their purchases have been for shipment to Finland. The ores are being refined there for shipment to Russia against reparations account.

London activity, where tungsten is one of the few commodities freed for trading, has not been entirely for this account. Whatever the ultimate destination, there is general agreement here that excluding the Russian purchases in China, London has led the market in the upsurge of demand that has gone on since last November. There have been complaints in both London and New York that speculators were responsible for the price increase, but mostly from consumer sources.

The prospects for the future expansion of tungsten consumption in every country are sufficiently promising to insure some speculative activity. In addition to the more common usual consumers, all of whom are expanding their needs, there have been a couple of rumors in the market that have tended to increase the upward pressure. Market experts "understand" that a new supersonic aircraft secret project will call for tremendous quantities of tungsten when the program is developed. The "experts" also understand that there is a possibility of additional government stockpiling of strategic materials.

As long as there is any element of uncertainty with respect to stockpiling, there can be little stability in the tungsten market in this country. Existing stocks, purchased by Metals Reserve, Army, Navy and the Treasury, and now held by the Army and Navy, are sufficiently large that they are a constant threat to today's market price. Some tool steel producers who are annoyed at high ferrotungsten prices are urging their senators to bring about the release of some stocks. On the other hand the national tendency toward more extensive stockpiling tends to influence the market in the opposite direction. Some new government decisions with respect to tungsten stockpiling policy are expected in Washington early next month.

High ferrotungsten prices, however, are not entirely attributable to high ore prices. During the war, a Metals Reserve price of $26 per unit price was sufficiently high to keep domestic producers of low-grade ores in production, and was generally favorably accepted. Since the war, mining costs in America have gone up considerably, particularly labor, and present labor unrest in the mines may send costs even higher.

All factors operating in today's tungsten market tend to indicate that with futures in 1947 ore completely sold, and continuing foreign activity in the market, the present price will not be the peak, either for ore or ferrotungsten. The tungsten market is an extremely sensitive one, and a change in the Chinese selling policy, regardless of the inducement, would affect the market immediately, as the Chinese monopoly can still produce tungsten much more cheaply than domestic producers.

An offer of 500 to 1000 tons of Chinese ore, on terms indicating that more would be forthcoming would probably be sufficient to break the present price level. There has been no report of any such offer as yet, however.

What, Again?

New York

• • • Regularly from 1936 until the beginning of the war Germany was extremely active in bartering as much tungsten as possible. Germany was also buying heavily in Bolivia, Argentina, Peru, Mexico, and the United States. As much as possible of this tungsten was being stockpiled for war use.

Today Russia is buying as much Chinese tungsten as possible at premium prices in China, and is obtaining additional supplies from a number of other countries through Finland at even higher prices. The USSR has also reported the opening of large tungsten ore mines in Asia Minor.

Barium Seeks $3 Million

Canton, Ohio

• • • Barium Steel Corp. has asked the Securities and Exchange Commission for permission to issue $3 million of 15-year sinking fund debentures, due July 1, 1962, with non-detachable subscription warrants. Barium Steel Corp. owns three Cleveland companies, Cuyahoga Spring Co., Geometric Stamping Co., and Porcelain Steels, Inc.

Holders of the new debentures would be entitled upon exercise of the warrants to acquire shares of Barium's $1 par common stock at the rate of five shares for each $100 debenture held. Cost would be $6 a share if exercised before July 2, 1948; $7 a share thereafter until July 1, 1949, and $8 if exercised thereafter before July 2, 1950.

If all debentures are sold, estimated proceeds of $2,800,000 will be used for corporate purposes, including payment of $1,025,000 of the balance due the Bankers Commercial Corp., which made loans to Barium in connection with the acquisition of Cuyahoga Spring Co. and the Bayonne (N. J.) Bolt Corp.

Consolidated Buys

Washington

• • • Consolidated Steel Corp. has purchased five surplus buildings and certain items of shipyard equipment owned by the government but located on their shipyard property in Maywood, Calif., for $65,278, WAA has announced.

PMI Head Criticizes Quotas, Integration And "Pittsburgh Plus"

Washington

• • • **Abolition of the** Pittsburgh Plus pricing system, use of the present quota system for steel distribution, and the continued integration of the steel industry are major factors operating to the disadvantage of the stamping industry, Tom. J. Smith, Jr., president of the Pressed Metal Institute, told the Senate Small Business steel subcommittee on June 20.

As a result of these and other contributing factors, he declared, some stampers are operating at reduced capacity, others are being slowly driven out of business, and still a third group is able to keep going only by buying sheet steel on the open market at premium prices.

He held that part of the stampers' reconversion difficulties stemmed from abolition of the Pittsburgh Plus system. With its abolishment, the Federal Trade Commission took the position that the dislocation of distribution would be roughly balanced between the mills, but the theory was not sustained in practice, he said.

Two major reasons for this were offered the subcommittee. First, that when the quota system was established, all allocations were based on the historical background of the consumer; next, that the mills closest to the base of consumer operations did not always roll the gage, the kind, or the size needed.

Three particularly specific complaints against the steel industry were registered by Mr. Smith on behalf of the stampers—that the "let 'em eat cake school" refuses to ship them hot-rolled sheets, that some mills are dropping historical customers whose orders are relatively small, and that others are discriminating against independents in favor of their own subsidiaries.

At least 10 large steel producers had been reported to the Pressed Steel Institute by its members as having notified them that their mills would not accept further orders for hot-rolled steel but that cold-rolled would be available. This, he said, costs about $20 a ton more.

He named the ten firms as the Allegheny Ludlum Steel Corp., Bethlehem Steel Co., Carnegie-Illinois Steel Corp., Great Lakes Steel Corp., Jones & Laughlin Steel Corp., Newport Steel Co. (Kaiser), Republic Steel Corp., Sharon Steel Corp., Superior Steel Corp., and the Weirton Steel Co.

Reports by the American Iron & Steel Institute, he said, show that twice as much hot-rolled sheet is being produced as cold-rolled. He raised the question as to where the hot-rolled output is going, pointing out that the AISI figures do not show this.

He further charged that the steel industry showed a marked trend toward conversion to the continuous type of operation by which wide sheet is produced "at 60 mph." Also, he said, there is a tendency to handle this sheet in large coils which works a further hardship on the stamping industry by working to drive the smaller stampers to steel warehouses which are equipped to cut and slit to size requirements.

The steel industry is entering more and more into competition with the stampers through continued integration, allocation, shipping and selling, it was held by the PMI head. The growing aluminum industry is doing the same thing, he added, with the big companies now entering the (aluminum) stamping and fabricating field.

"There are about 200 sources of supply for fabricated steel (disregarding all warehouses)," he declared. "This concentration of production facilities within the industry has resulted in several fully integrated companies which mine ore and coal and carry through to where they not only manufacture steel but distribute it to their own warehouses in competition with the independent stamper."

He expressed the opinion that a great deal of the shortage could be overcome by stopping the "squandering" of cast iron by casting and turning to stamping.

It was stated that some mills have moved to cut off small customers altogether and others to withdraw from certain areas. He explained that it was common talk in the trade that Bethlehem had stripped about 425 historical customers from its lists for "economic reasons." These customers, he said, were found to have been purchasing at a rate of 40 tons a month or less; they are afraid to complain to the government, Mr. Smith said.

All of these various factors, he said, had resulted in virtually every stamping firm, at one time or another, going into the gray market for steel in order to keep from closing down.

To Head Munitions Board

Washington

• • • **Thomas J. Hargrave,** president of the Eastman Kodak Co., has been named chairman of the Army-Navy Munitions Board, succeeding Richard R. Deupree, president of Proctor & Gamble, who has served as chairman since February 1946. The appointment was made by the President on the recommendation of the Secretaries of the War and Navy Depts.

RED ECHO: *The five passenger "Probeda" (Victory) car manufactured in the Molotov plant in Gorky appears to have been influenced by Detroit and South Bend designers. Its 4-cylinder 50-hp engine is said to give it a speed of about 73 mph.*

To Propose Bill For Expanding Steel Output

Washington

• • • **Sen. James E. Murray,** D., Mont., has under preparation proposed legislation providing for federal action to create additional steelmaking capacity for the United States.

As a prelude to the bill, Senator Murray plans to call for a study of the subject by Congress and the White House economic advisers to obtain an official government estimate of capacity needed for full employment.

The Murray measure would "open up resources of the RFC," if necessary, to finance expansion. In cooperation with local banking institutions, the RFC would underwrite long-term, low-interest loans with provision for waiving interest in case of hard sledding.

Also, the measure may propose that, if needed, a Federal agency be set up to build new plants (ownership to be retained by the Government) for lease to steel producers.

Committees Named To Put Ceiling On Foreign Aid Funds

Washington

• • • **Formation of three** committees to find out how much foreign aid is needed and how much can be given by the United States without danger of wrecking domestic economy has been announced by the White House.

Decision to make the study follows warnings by Congressional and public figures that this country is in danger of overexporting national resources; also, it comes on the eve of the Senate steel subcommittee probe into export shipments of steel, especially pipe and tinplate.

Two committees, headed by Interior Secretary J. A. Krug and Economic Council Chairman Edwin C. Nourse, will make studies within the government. A third group, headed by Commerce Secretary W. Averell Harriman, will be composed of business men, educators and other public figures. Invitations have been extended to:

Hiland G. Batcheller, president, Allegheny Ludlum Steel Corp.; Paul G. Hoffman, president, Studebaker Corp.; John L. Collier, president, B. F. Goodrich Co.; Owen D. Young, honorary chairman of the board, General Electric Co., and Robert Koenig, president, Ayrshire Collieries Co.

Also, Robert E. Buchanan, Iowa State College; Edward S. Mason, Harvard University; William I. Myers, Cornell University; and Robert G. Sproul, University of California.

Also, Robert M. La Follette, Jr., former Wisconsin senator; James B. Carey, secretary-treasurer, CIO; George Meany, secretary-treasurer, AFL; W. Randolph Burgess, National City Bank, New York City; and Chester C. Davis, president, Federal Reserve Bank, St. Louis.

And, Granville Conway, president, Cosmopolitan Shipping Co.; R. R. Deupree, president, Procter & Gamble; Harold G. Moulton, president, Brookings Institution; Melvin F. Coolbaugh, former president, Colorado School of Mines; and Calvin B. Hoover, Duke University.

Labor Bill in Brief

Washington

• • • **The Taft-Hartley labor bill, which became law June 23, after being passed over the Presidential veto makes no change in employer responsibility to bargain collectively but does place a parallel obligation upon labor and assures employers the right of free speech within limits (that is, coercion or reprisal threats are forbidden). Major provisions of the new law.**

Makes illegal all secondary boycotts and forbids certain types of jurisdictional strikes. None may strike against the government.

Outlaws closed shop contracts, permits the union shop. However, state laws supersede the act.

Establishes procedure, permitting injunction, for settling strikes involving essential industries and emergencies.

Provides certain regulations for organization of professional workers, foremen and guards.

Sets up financial responsibility, allowing court action against unions for contract violation and other causes.

Enlarges the NLRB from three to five members and separates its power of prosecution.

Places curbs but no outright ban on industry-wide bargaining.

Prohibits featherbedding contracts, including employment of standby workers.

Asserts Opposition Of Lake Ore Industry To St. Lawrence Waterway

Washington

• • • **In testimony before** the Senate Foreign Relations Committee last week, Alexander C. Brown, president of the Cleveland-Cliffs Iron Co., declared that the Lake Superior iron ore industry was opposed to the proposed St. Lawrence Waterway. He asserted that it would seriously interfere with the taconite and jasper development. "Certainly," he said, "if millions of tons of iron ore are expected to enter the Lakes via the St. Lawrence, the proposed 27 ft channel would not suffice for the vessel draft required.

"But," he added, "it would not take many millions of tons of iron ore produced by cheap labor and transported in foreign ships to seriously disturb market conditions for Lake Superior District iron ore, and to demoralize shipping on the Lakes where sailors are paid very much higher wages than by any foreign country.

"Furthermore," he declared, "the uncertainty which the St. Lawrence project would inject into the iron ore situation would tend to delay the taconite program indefinitely. The industry would wait to see the extent to which iron ore imports do become available to lower Lake furnaces and at what cost.

"This iron ore industry," he went on to say, "is confident of its ability eventually to supply large volumes of high-grade iron ore concentrates from this source for an almost unlimited time, provided it is permitted to continue unhampered, in a normal evolutionary pattern, the progress already made on the technical and economic problems involved in this undertaking.

"The future of a vast population, not only those dependent on the mining industry, but many others in the whole Great Lakes basin," Mr. Brown said, "is dependent upon the successful culmination of this taconite and jasper program. The selfsufficiency of our country in one of the most vital of raw materials is dependent on it. The alternative —of allowing our steel industry to become dependent on foreign sources of iron ore — is unthinkable and completely unsound from a national policy point of view."

Sea Water Corrosion Tests Yield Valuable Data for Industry

Cooperative Program Finds Immersion Superior To Salt Spray Testing

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Wilmington, N. C.

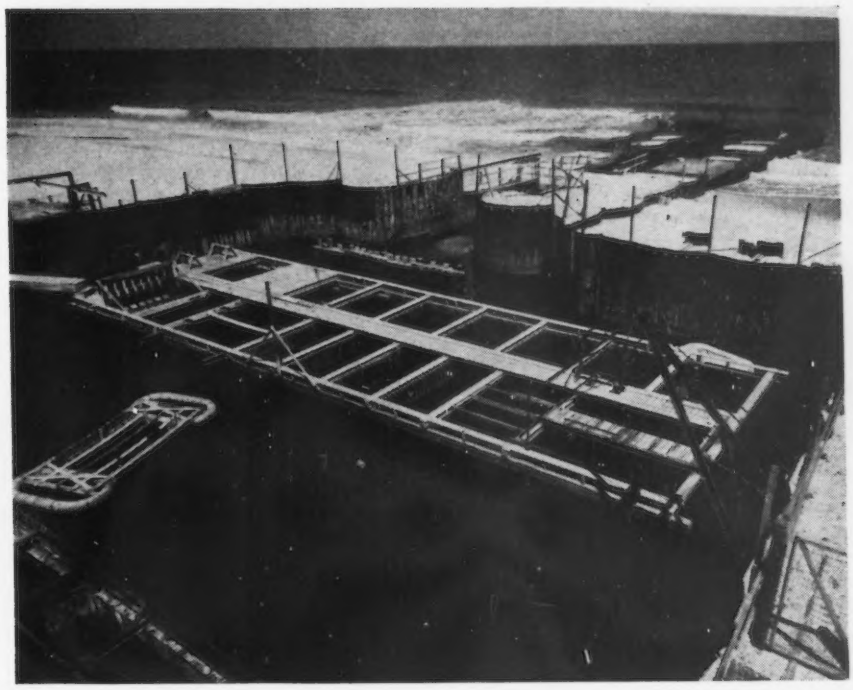
• • • **Facts on the corrosion** of metals that are expected to be of broad use to industry are being uncovered by investigators at the marine exposure test station at Kure Beach, near Wilmington, N. C. Here sea water immersion and marine atmosphere exposure tests of carbon and alloy steels, aluminum and magnesium alloys, brasses and bronzes, nickel and nickel alloys, metallic and organic coating materials, and other materials such as ropes and wood have been in progress for many years. The project is a cooperative industrial enterprise for which maintenance and development costs are shared by the International Nickel Co. and the Dow Chemical Co. Others participating in the tests are Carnegie-Illinois Steel Co., American Rolling Mill Co., Union Carbide & Carbon Co. and many others who have contributed corrosion specimens for comparative testing.

At the present time approximately 15,000 specimens are undergoing marine atmosphere exposure tests. There are about 2000 specimens now immersed in sea water. During the last 12 years immersion tests have been given to some 10,000 specimens. Tests have included studies of anti-fouling formulations and the effects of marine growth on metals and wood.

For more detailed results of corrosion tests see "Marine Tests Rate Alloy Performance" by J. Albin, THE IRON AGE, *July 26, 1945, p. 62.*

The corrosion tests at Kure Beach have indicated the inadequacy of salt spray tests and other laboratory methods of determining the relative resistance of metals to corrosion in sea water or in marine atmospheres.

Exposure tests have included a study of the effects of copper in openhearth irons, openhearth steels and bessemer steels; the effects of up to 5 pct nickel on steels; and the effects of up to 18 pct chromium on steels.



SEA WATER AT WORK: *Marine testing basin at Kure Beach, N. C., where over 10,000 specimens have been subjected to immersion tests in the past 12 years. Over 2000 specimens of domestic and foreign steels and nonferrous metals are currently under test here.*

Those steels that resisted corrosion best have shown a strong tendency for the rate of weight loss to decrease as the period of exposure was increased. However some of the openhearth irons containing little copper showed increases in corrosion with time, perhaps due to the formation of thick layers of hygroscopic rust that serve to keep the specimens moist. The rust films formed on the alloy steels were very thin, tightly adherent and quite evidently protective. In general, the darker the color of the rust film on steel, the lower the rate of weight loss.

Tests indicate that in a marine atmosphere most of the advantage from the presence of copper is obtained when about 0.05 pct is present, with little further improvement when copper content is raised to as much as 1 pct in either openhearth or bessemer steels. When combined with nickel, larger contents of copper seem to be more effective. Copper is most potent in openhearth irons, and within the range from 0.004 to 0.02 pct.

Phosphorus appears to have a fairly potent effect in improving corrosion resistance, especially when the copper content is below the critical amount. While the high phosphorus low copper steel is not particularly good, it is much better than low phosphorus compositions of equal or slightly higher copper content. Phosphorus is also helpful in other steels. Thus bessemer steels are slightly superior to openhearth steels with equivalent copper content.

Manganese appears to have a slightly beneficial effect on atmospheric corrosion. This is noticed in steels containing less than the critical amount of copper, as well as in steels of higher copper content.

Nickel has a uniformly beneficial effect which is roughly proportional to the nickel content. It appears that in steels containing more than the critical amount of copper (about 0.05 pct) and less than 5 pct total alloy, nickel is the most effective

element in improving resistance to corrosion by marine atmospheres. Nickel showed up to advantage in complex steels in which it was supplemented by copper, chromium, molybdenum, silicon, etc. in various combinations. In fact, some of these steels approached the level of corrosion resistance of the straight 5 pct nickel steel.

The effect of increasing the chromium content of steel was to improve its resistance to corrosion roughly in proportion to the chromium content. With large amounts of chromium, 13 pct or more, there was little or no weight loss. However, the 13-pct chromium steel developed a fairly uniform thin coating of rust. The 18-pct chromium steel developed considerable stain, with occasional blotches of very thin rust.

The austenitic chromium nickel steels were superior to the straight chromium steels. The 18-8 steels, including types 301, 302, 304, 321 and 347, were very much the same and showed only slight stains and occasional superficial pitting, neither of which appeared to progress much after the first six months of exposure. Types 316 and 310 were superior and remained virtually unchanged in appearance.

Specimens of Monel, K-Monel, nickel, Z-nickel and Inconel have been exposed for about 5 years. Monel has acquired a thin olive green film without any other evidence of appreciable attack and with no pitting. The film on the K-Monel appears to be somewhat thinner than on Monel. Nickel and Z-nickel have lost some of their metallic lustre, but have not otherwise changed much. Inconel has remained quite bright and shows very little change in appearance. Specimens of all these metals were removed after exposure for 4 years, were reweighed and subjected to tensile tests to observe changes in mechanical properties. Changes in tensile properties were hardly outside the error of the determination.

Since zinc is often used as a means of calibrating a corrosive atmosphere and observing changes in its corrosive characteristics, pure zinc specimens have been exposed and weight loss determinations made from time to time. Similar determinations have been made from the British Iron & Steel Institute standard ingot iron specimens. The latter have indicated that the Kure Beach atmosphere is representative of a marine environment of something more than average corrosivity.

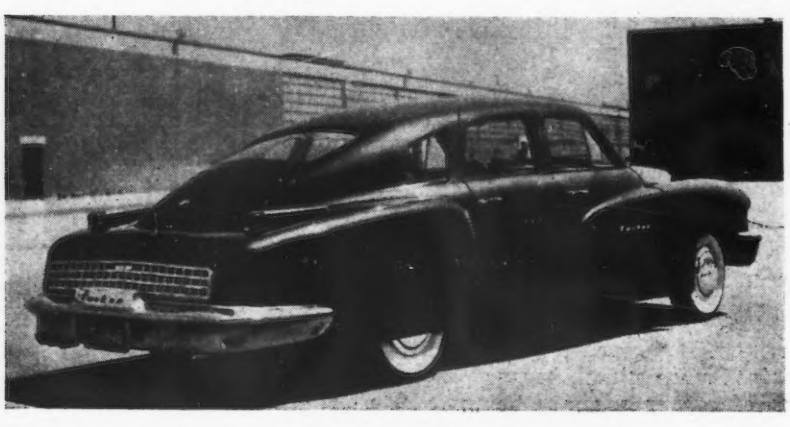
Erosion and impingement effects of sea water on metals and alloys are being studied at Kure Beach for their importance in the service life of condenser tubing, pump impellers and propellers. In the study of the erosion of metals, specimens are fastened to a whirling disk which provides velocities up to 30 fps. Condenser tube alloys are tested in short tube sections placed in brackets which simulate small sections of tube sheets. For studying the effects of impingement on metals, specimens are subjected to the action of submerged jets of sea water mixed with air. Metals having adequate resistance to impingement attack quickly form a tightly adherent protective film which is observable on inspection.

One of the spectacular demonstrations of corrosion resistance is offered by the more than 5000 specimens of magnesium alloys exposed for 5½ years. These specimens include rolled, extruded and die casting alloys and include a variety of surface finishes such as ground finish, chrome pickled and Dow No. 7 chemical treatment. Dowmetal M with a ground surface almost immediately took on a superficial corrosion film spotted with tiny white dots but the specimens have continued without change ever since. In general the magnesium alloys have resisted the salt atmosphere corrosion very well with very minor surface pitting or etching.

Tests of magnesium specimens in bolted or riveted assemblies indicate that 56-S aluminum rivets in a corrosive atmosphere offer maximum resistance tc the effects of galvanic corrosion. A series of bolted assemblies with and without washers providing many combinations of dissimilar metals has indicated that in a salt atmosphere zinc makes the best galvanic couple with magnesium but in seawater immersion cadmium makes the best galvanic couple for protective purposes.

Magnesium anodes, used for sacrificial corrosion in galvanic couples when used with steel pipelines, tanks and similar applications are currently under test to develop maximum effectiveness. H-1 magnesium anodes have been found to release 600 amp-hr per lb of metal in contrast with 350 amp-hr per lb of zinc anode.

PILOT TORPEDO: *First hand made model of the Tucker car shows the big rear end housing the engine. Six individual exhaust pipes extend underneath the bumper of the radically designed car.*



Superior Drawn Steel Buys

Washington

• • • **Superior Drawn** Steel Co. has purchased war surplus facilities adjacent to its own plant at Monaca, Pa., for $120,000, which is 90 pct of the appraised fair value, WAA has announced. The facilities had an original cost of $282,602, including $154,413 for equipment.

In 1942 the plant facilities were sponsored by the WPB and were operated in the cold-drawing, annealing and stress-treating of steel bars. The property is dependent upon the Superior plant for utilities and would not be capable of independent operation without additional expenditures estimated at $75,000.

Weekly Gallup Polls . . .

Public Approves of Action on Peacetime Training Bill

Princeton, N. J.

• • • **President Truman's** forthright request to Congress for action on the peacetime military training bill strikes a responsive chord in public opinion, according to George Gallup, director, American Institute of Public Opinion.

For 4½ years a substantial majority of voters polled by the institute has expressed approval of a program of 1-year's military or naval training in peacetime for all able-bodied young men. The most recent survey of public opinion on the matter, completed during the first week in June, finds the same high majority in favor, as follows:

"In the future, do you think every physically-fit young man (who has not already been in the armed forces) should be required to take military or naval training for 1 year?"

The vote:

	Pct
Yes	74
No	21
No opinion	5

The current difficulties with Russia may help to account for the large majority in favor of peacetime preparedness. One of the major reasons given by voters in support of the program is that the United States must never again be caught weak and unprepared as she was in 1941. The second reason given in favor of peacetime training is that a taste of military discipline and orderliness would be good for the young men.

The President's advisory commission on military training, headed by Dr. Karl T. Compton of the Massachusetts Institute of Technology, turned in a report early this month unanimously recommending a 1-year training period. Whether Congress will take action at this session is uncertain, according to Washington observers. But the position of the general public on the principle of peacetime training should be clear from the following trend in institute polls:

	Yes Pct	No Pct	No opin. Pct
Dec. 1942	66	27	7
Nov. 1943	63	29	8
Sept. 1944	63	23	14
Dec. 1944	70	25	5
Feb. 1945	69	22	9
May 1945	70	24	6
July 1945	69	24	7
Oct. 1945	70	24	6
Nov. 1945	75	21	4
Feb. 1947	72	23	5
Today	74	21	5

Peacetime training is one of those issues on which the minority side is apt to bring more pressure to bear on Congress than the majority. Mothers and fathers who do not want to see their sons have military training in peacetime tend to be more vocal in their opposition to such a bill than those who are willing to see their boys make the sacrifice. People willing to undergo sacrifice are seldom likely to make a big noise about it.

One of the facts that stands out clearly in the recent survey is the remarkable uniformity of support for peacetime military training in all major population groups. As the following table indicates, all favor the program by 70 pct or more.

	Yes Pct	No Pct	opin. Pct
Veterans of World War II	76	21	3
By age			
21-29	74	23	3
30-49	75	21	4
50 & over	73	20	7
By sex			
Men	73	22	5
Women	75	20	5
By parties			
Democrats	77	18	5
Republicans	71	24	5
By education			
College	70	26	4
High School	73	24	3
Grade School or no school	76	18	6

•

• • • **A bill was introduced** in Congress recently to raise the minimum wage of workers in industrial firms engaged in interstate commerce from the present 40¢ an hr to 75¢ within the next 2 years.

Strong Sentiment Also Favors Raising Minimum Wage From The Present 40¢ to 65¢ an Hr

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The general public has long been in favor of increasing the minimum wage—at least up to 65¢ an hr. In a nationwide public opinion poll completed just prior to the introduction of the bill, the institute found sentiment running about 3-to-1 in favor of a 65¢ minimum.

The actual vote was as follows:

"At the present time, the minimum wage that can be paid to workers in every state in most businesses and industries is 40c an hr. This means that all persons working in such businesses, in every state, including young people who have never worked before, cannot be paid less than 40¢ an hr. Would you approve or disapprove of raising this minimum to 65¢ an hr.?

	Pct
Approve	71
Disapprove	24
No opinion	5

The present Congressional bill, cosponsored by 11 senators and 2 representatives, would increase the minimum wage for industries in interstate commerce to 65¢ an hr upon enactment, to 70¢ 1 year later, and to 75¢ an hr 2 years later.

One reason of course for the high majority in today's poll is that in the mass population there are many more wage earners who would benefit by the increase than employers who would have to pay out the additional money. Some economists claim that raising the minimum will increase the cost of consumer goods, and that if consumers fully realized this they would be less in favor of a higher minimum wage.

There is a marked difference of attitude toward the measure ac-

(CONTINUED ON PAGE 149)

Personals

(CONTINUED FROM PAGE 88)

• **John G. Gaisser** has been elected comptroller of F. H. McGraw & Co., New York, and Hartford, Conn. He was a supervisor on the staff of Lybrand, Ross Bros. & Montgomery, prior to military service.

• **G. L. Pike** has been appointed sales representative by Gibson Electric Co., Pittsburgh. His territory covers all of the New England States.

• **Lewis R. Brown,** manager of the General Electric Co., Pittsfield, Mass., transformer division, will retire on July 1. He has been with the company 43 years.

• **Paul R. Croll** has been named assistant to the vice-president in charge of the paint division of Pittsburgh Plate Glass Co., Pittsburgh. In addition, he will have overall responsibility for manufacturing operations of the various branches of the division. He has been associated with the company's paint division since 1922. In 1940, he was appointed technical assistant to the vice-president and transferred to the company's general offices at Pittsburgh. **Dr. William H. Lycan,** formerly director of paint division research with headquarters at Milwaukee, has been appointed executive director of research with offices at Pittsburgh. **Dr. Howard L. Gerhart,** staff chemist at the Milwaukee research laboratory since 1937, has been appointed director of research for the paint division with headquarters at Milwaukee.

• **Benjamin B. Frost** has been appointed sales engineer in the iron and steel division, Arthur G. McKee & Co., Cleveland. He will assist Merrill Cox, sales manager of this division. Mr. Frost has been the company's iron and steel plant service engineer for the past 11 years. **Robert E. Touzalin,** formerly Mr. Frost's assistant, will take over Mr. Frost's duties as service engineer.

• **Lowell O. Gill** has been appointed assistant technical director and **Dr. Paul R. Shildneck,** director of research of A. E. Staley Mfg. Co., Decatur, Ill.

• **William R. Demmer** has been appointed assistant general manager of the Zeropoint Water Softener Co., Milwaukee. He returned to the company recently after 3 years of technical service in the Navy.

• **John F. McMullen** has been appointed superintendent of the car department of the Erie R.R. Co., Cleveland, succeeding **W. E. Harmison** who has retired after 31 years. Mr. McMullen joined the Erie in 1911.

• **George A. Smith,** formerly assistant plant manager at Meriden, Conn., becomes general manufacturing manager of the New Departure Div. of General Motors Corp., Bristol, Conn. **Robert E. Young** has been transferred from Meriden to become director of inspection. **Robert T. Collins** has been made director of personnel.

• **Howard L. Ginaven** has been appointed general superintendent of Goodyear Tire & Rubber Co.'s plant in Wolverhampton, England. Mr. Ginaven joined Goodyear in Akron, Ohio, in 1934, starting on the production training squadron. He has held several posts in the development division and during the war he was assigned to military products engineering. Since 1944 he has been on the foreign operations staff. In England he succeeds **H. A. Brittain** who will return to Akron on a new assignment.

• **Raymond R. Wiese** has been elected secretary-treasurer, Drafting Associates, Inc., Bristol, Pa. Mr. Wiese was formerly assistant to the manager, Kaiser Fleetwings, Inc.

• **Clyde G. Remmo** has been named sales manager, appliance division of F. L. Jacobs Co., Detroit. He succeeds **J. W. Stigall,** resigned. **T. R. Buttrick** has been made assistant sales manager and **M. H. Powless** will be in charge of distribution in the appliance division.

OBITUARY...

• **Charles A. Kirk,** 43, executive vice-president of International Business Machines Corp., New York, died suddenly June 16 while in Lyons, France.

• **F. J. Vlchek,** founder and president of Vlchek Tool Co., Cleveland, died June 10.

• **Stewart T. Smith,** 56, structural engineer for Stone & Webster Engineering Corp., Boston, died unexpectedly June 11.

• **W. Snowdon Smith,** 91, former secretary-treasurer of the Cincinnati Rolling Mills, Cincinnati, died June 8.

• **Martin L. Badhorn,** 66, secretary-treasurer of the Automatic Voting Machine Corp., Jamestown, N. Y., died recently.

• **Arthur Birch,** 83, owner and manager of the Arlington Machine Works, Arlington, Mass., until he retired in 1942, died June 5.

Coming Events

June 30-July 1 American Foundrymen's Assn., chapter chairman conference, Chicago.
July 14-18 American Society of Civil Engineers, Duluth, Minn.
Aug. 25-29 National Assn. of Power Engineers, Inc., Boston.
Sept. 8-12 Instrument Society of America, conference, Chicago.
Sept. 10-12 Porcelain Enamel Institute, Inc., Columbus, Ohio.
Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Chicago.
Sept. 22-25 Assn. of Iron & Steel Engineers, annual meeting, Pittsburgh.
Sept. 29-Oct. 3 American Gas Assn., San Francisco.
Oct. 2-3 Gray Iron Founders' Society, annual convention, Milwaukee.
Oct. 6-7 Packaging Machinery Manufacturers Institute, annual meeting, Springfield.
Oct. 16-17 National Conference on Industrial Hydraulics (formerly Hydraulics Machinery Conference), annual meeting, Chicago.
Oct. 18-24 National Metal Congress, Chicago.

Warns That Reserves Of U. S. Tin Will Be Spent by Year's End

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Washington

• • • **With total stocks of tin in the United States dropping 2429 tons during the first quarter of 1947, the Commerce Dept. has again sounded the warning that even with renewal of controls past the June 30 expiration date, total reserves in this country will be virtually exhausted by the end of the year.**

Total stocks totaled 75,496 long tons on Apr. 1, a decline of about 19,000 tons over the nation's position on the same date last year.

Meantime, consumption during the quarter increased slightly by 670 tons, and the total amounted to 22,780 tons. Receipts during the quarter totaled 10,944 tons, including a transfer to the OMR of 5490 tons received from Japan during 1946.

UNITED STATES TIN STOCKS

(Long Tons of Tin Content)

DATE	GOVERNMENT STOCKS			PRIVATE STOCKS			TOTAL
	Concentrate	Pig Tin	Total	Pig Tin	Other	Total	
Apr. 1, 1946.....	34,319	37,520	71,839	14,059	8,567	22,626	94,465
Jan. 1, 1947.....	24,642	29,337	53,979	14,837	9,109	23,946	77,925
Apr. 1, 1947.....	22,383	28,639	51,022	15,155	9,319	24,474	75,496

SOURCE: Dept. of Commerce. These figures include 12,140 tons of Treasury and Navy Reserve Stocks not available for allocation but excludes 9817 on Jan. 1 and 4327 tons on Apr. 1 of tin from Japan brought here for the account of the occupation authorities for weighing, sorting and analysis and which was or will be eventually available for purchase by all consuming countries in accordance with Combined Tin Committee allocations.

A large part of the tin received from Japan was made available for allocation by the Combined Tin Committee and the 5490 tons represents U. S. purchases against Committee allocations. Secondary supplies during the quarter amounted to 7564 tons.

In making its report, Commerce's Office of Materials Distribution pointed out that almost all of the quarter's decline occurred in reserves of concentrates since the government-owned smelter at Texas City, Tex., continued to operate in excess of current receipts.

CONSUMPTION OF TIN AND TIN IN ALLOYS BY CLASS OF PRODUCT JANUARY-MARCH 1947

(Long Tons)

Tin and terneplate	7,051
Brass and bronze	6,108
Solder	5,378
Babbitt	1,865
Tinning	711
Collapsible tubes	304
Foil	110
Type metal	380
Chemicals	44
Pipe and tubing	143
Other and unclassified	686
TOTAL	22,780

SOURCE: Dept. of Commerce. Table includes exports and re-exports of pig tin.

Steel Construction Men Note Signs Of Improved Supplies

New York

• • • **Steel construction men are** so cautious concerning future steel supplies that they will only say that they expect deliveries to be satisfactory next year, according to L. Abbett Post, executive vice-president of the American Institute of Steel Construction. Speaking before an engineering conference of that body held here recently, he stated that there already were some indications that the steel supply situation is improving.

Attending the conference were 14 district engineers of the institute, located at Atlanta, Chicago, Cleveland, Dallas, Greensboro, N.C., Los Angeles, Milwaukee, Omaha, Philadelphia, St. Louis, San Francisco Seattle, Topeka and Worcester, Mass.

The district engineers commented briefly on the construction situation in their respective areas and it was noted in some areas that the business situation is beginning to show signs of returning to normality. Some engineers reported that fabricators were now beginning to bid on a fixed price-firm delivery basis.

The institute now has a membership of over 200 companies, which fabricate more than 90 pct of the structural steel for buildings and bridges in this country, according to Mr. Post. He said 350,000 copies have been sold of the manual of steel construction issued by the institute, and accepted officially by government and local officials as the standard for specifications and procedures in building with steel.

T. R. Higgins, director of engineering, told the conference that the accurate measurement of the sway of the Empire State Building, taken by the institute soon after its erection, enabled the U. S. Army to check the damage done to the building in a short time, following the crash of an army bomber against the building in 1945. The structural frame of the building was virtually unimpaired.

Mr. Higgins reported that recent research carried on by the institute on fire resistance afforded by various constructions used to cover steel frames of buildings will reduce construction costs by encouraging the use of new materials and methods.

Work of the field staff of the institute in assisting city officials in preparing building codes was described by Jack Singleton, chief engineer. He said building officials, highway organizations, regional planning boards and boards of education are increasing their use of technical assistance on building projects, supplied by the engineering staff. Consulting engineers and practicing architects are utilizing the services of the staff as never before, Mr. Singleton said.

Chicago Firm Buys Track

Washington

• • • **L. B. Foster Co.,** Chicago, has purchased through WAA 10.3 miles of standard gage, 90-lb rails together with 8.5 miles of narrow gage 35-lb rails, located at the former ordnance plant at Weldon Springs, Mo., outside St. Louis. The price paid was $82,955.50, the purchaser to remove the trackage.

Labor Dept. Surveys Productivity in Machine Tool Plants

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Study of 1939-1945 Period Shows War's Effects On Manhour Output

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By GENE HARDY
Washington Editor

o o o

Washington

• • • **The average number** of manhours required to build a dozen major types of machine tools in 1945 was about 3.8 pct above the corresponding figure for 1939, according to a newly released study of the Bureau of Labor Statistics entitled, "Trends in Man-Hours Expended per Unit for the Manufacture of Selected Machine Tools."

First of a new series of productivity studies to be made available by BLS, the machine tool report covers about three-fourths of the industry's production by value. A new approach to productivity studies was used in the current series and for the first time direct reports from individual manufacturers were used as a base. Manhour requirements on a product basis were also included for the first time.

Many of the conditions described in the BLS survey no longer exist and productivity is believed to have increased since the end of the war. The Bureau's report, however, is the first in this field to show the effects of the war on manhour output. These changes in worker productivity have formerly been guessed at but never accurately measured.—Ed.

During the period 1939 to 1941, the bureau found that manhours expended per machine manufactured declined approximately 10 pct and in the years 1941 to 1943 remained at approximately the same level. This reduction accompanied the phenomenal wartime expansion in the production of machine tools, which reached a peak late in 1942. The increased volume made possible many economies associated with quantity output of similar machines and greater specialization by labor and equipment.

The ensuing rise of some 14 pct from 1943 to 1945 resulted from factors which tended to lower productive efficiency: Increases in overhead labor; losses of experienced personnel and addition of new workers; and wartime shortages of materials and facilities, according to BLS.

"Unit manhours expended," as used in the report, means the number of manhours used in the manufacture of a single unit of the product.

BLS in making this study covered 12 general-purpose machine tools, and a representative cross-section of the producing industry. Tools covered were: Horizontal boring machine, standard table type; vertical boring mill; horizontal internal or internal-and-surface broaching machines; single-spindle upright drill; radial drill; reciprocating horizontal surface grinder; universal tool and cutter grinder; engine lathe; turret lathe; automatic screw machine; horizontal-type plain milling machine; and horizontal-type shaper.

As shown in the accompanying tables, the number of direct manhours alone expanded in the production of a machine tool, (i.e., manhours of non-supervisory wage earners engaged in productive machine operation and assembly work) declined on the average about 19 pct between 1939 and 1943. After that year, direct manhours expended per unit rose approximately 10 pct and by 1945 reached a level about 90 pct of the 1939 base.

The figures show that the proportion of indirect labor (supervision, materials handling, maintenance, and other factory labor not engaged directly on productive operations) increased generally throughout the period between 1940 and 1945. The indirect labor component thus partly offset the decline of direct labor requirements up to 1943, and accounted for part of the upturn in unit labor requirements after that year.

In tables 1 and 2 direct and indirect labor manhours, the sum of which constitutes unit manhours, are defined in a manner which conforms with general accounting practice as reported by individual companies. While indexes for the following products were computed,

TABLE I

Indexes of Unit Manhour Requirements (Direct and Indirect Labor) for the Manufacture of Selected Machine Tools
By Type of Machine Tool (1939=100)

	1940	1941	1942	1943	1944	1945
ALL REPORTED PRODUCTS	91.5	89.5	91.3	90.5	100.8	103.8
BORING MACHINES	94.5	99.8	97.0	93.1	93.9	99.5
Horizontal boring machines	84.1	87.3	80.0	80.5	96.5	94.6
DRILLING MACHINES	84.0	78.7	75.1	72.5	80.9	87.2
Single-spindle upright drills	97.1	95.0	95.1	96.0	98.2	108.7
Radial drills	81.3	75.5	71.1	67.8	77.4	82.9
LATHES	89.4	89.4	92.6	91.6	115.5	107.2
Engine lathes	96.2	95.3	93.4	100.0	107.2	100.8
Turret lathes	82.2	77.7	81.6	81.3	105.5	102.4
SHAPERS						
Horizontal shapers	91.4	90.3	92.8	97.2	93.6	99.3

NOTE: These indexes show the average relationship between manhours expended and units of product for the selected types of machine tools covered. The trends are determined by the combined influence of a large number of factors; including changes in equipment, production methods, management policies, skill and efficiency of the work force, availability of materials, capacity utilization, and others.

The figures shown in table 1 include total factory manhours, as generally classified by factory accountants. General administration, office, engineering and sales employees are excluded. The figures shown in table 2 refer only to workers engaged directly on production operations, primarily machining and assembly. The first table covers and the second table excludes such functions as timekeeping, shipping and receiving, materials-handling, production scheduling, machine set-up, inspection, maintenance, engineering of tools, dies, and gages, and plant supervision.

they were not separately reported because individual company trends might have been revealed: vertical boring mills, horizontal broaching machines, horizontal surface grinders, tool and cutter grinders, automatic screw machines, and horizontal plane millers. However, these indexes are all included in the combined indexes for all reported products and in product group indexes where appropriate. These indexes represent averages of the trends reported by the participating plants.

Any movement in the indexes must be interpreted in terms of factors affecting individual plants, according to the report. The indexes would not be affected, for example, by a tendency for the industry's output to concentrate in the most efficient plants, although such a development would reduce the average number of man-hours required by the industry as a whole to turn out a given machine.

Individual plant trends may be influenced by factors that include introduction of improved equipment and processes, management production policies, employee efficiency, the degree of utilization of capacity, and others. The indexes also reflect the effect of the many normal minor changes in product design; however, figures reflecting the influence of major design changes were excluded in computing the indexes.

The report also contains an index of manhour requirements by size of plant shown in table 3.

According to the data received by BLS, the factors which tended to improve production efficiency are:

(1) Changes in production methods; (2) installation of new machine tools in the machine tool plants; (3) high production volume and standardization of design; (4) increased use of cemented carbide cutting tools; (5) introduction of new materials-handling and other equipment; and (6) changes in plant layout.

The most important factor which tended to lower production efficiency, in addition to loss of experienced employees and use of untrained workers, was the increasing use of indirect labor. The percentage which indirect hours bears to direct hours commonly increased by one-fourth to one-half over the period. In a few plants it virtually doubled. A small number of plants reported a decrease in the indirect labor proportion during the period of rising production and a rise thereafter.

TABLE 2

Indexes of Direct Labor Manhour Requirements for the Manufacture of Selected Machine Tools

By Type of Machine Tool (1939=100)

	1940	1941	1942	1943	1944	1945
ALL REPORTED PRODUCTS	94.1	88.5	85.0	80.6	87.8	90.4
BORING MACHINES	92.4	93.9	87.2	79.0	79.6	83.1
Horizontal boring machines	84.6	89.1	82.2	81.4	85.3	95.6
DRILLING MACHINES	88.7	83.6	78.1	72.5	77.0	82.1
Single-spindle upright drills	103.3	100.3	98.8	95.7	92.5	96.8
Radial drills	85.7	80.2	74.0	67.8	73.9	79.1
LATHES	89.1	86.3	86.7	82.7	103.6	100.0
Engine lathes	97.7	96.5	93.4	91.7	95.1	91.5
Turret lathes	80.3	89.8	88.3	67.9	90.1	94.9
SHAPERS						
Horizontal shapers	95.3	86.4	86.3	93.0	89.3	93.3

This rise in indirect labor is largely attributable to the following:

(1) Additional personnel required by expansion in the industry and inexperienced new employees.

(2) Increased maintenance, caused by more continuous operation and mishandling of equipment by green labor.

(3) Transfer of some functions, such as tool grinding and set-up, from direct labor to the overhead category through creation of specialized departments.

(4) Wartime creation or expansion of systems of production and materials scheduling and control.

Other factors which tended to increase labor requirements were the excessive turnover during the war years and perhaps to some extent, very long working hours. The extent of capacity utilization was another important factor after the production peak had been passed.

While the report devotes considerable space to design changes in machine tools it can be readily seen that this factor did not have too much effect on labor requirements. Virtually all the companies contacted indicated that no significant changes were made in the models reported upon.

Specification changes included simplification of the paint job, substitution of national emergency steels and of bar stock for forgings, but their effect was not evaluated.

Other reported trends which may have increased the man-hour requirements are: Adaptation of machine tools to cemented carbide cutting tools, electric drives and electrical or electronic controls, hydraulic actuation, and "streamlining."

TABLE 3

Indexes of Unit and Direct Labor Manhour Requirements for the Machine Tool Industry

By Size of Plant (1939=100)

Size Group *	1940	1941	1942	1943	1944	1945
	Unit Manhours (Direct and Indirect Labor)					
Companies employing:						
More than 1000 wage earners	97.8	96.2	101.6	101.2	111.5	110.4
251–1,000	88.2	90.8	84.8	85.4	90.3	89.2
101– 250	82.2	82.2	83.1	84.0	99.5	101.2
100 or fewer	92.1	71.3	76.7	81.9	83.8	86.6
	Direct Labor Manhours					
Companies employing:						
More than 1000 wage earners	100.9	92.2	88.9	86.1	86.2	94.5
251–1,000	91.9	91.4	82.0	80.4	81.6	80.1
101– 250	85.9	79.9	78.9	73.2	83.7	89.2
100 or fewer	94.1	84.0	81.6	85.7	85.7	90.1

* Reporting establishments are here classified according to the monthly average of wage earners employed, *on machine tool production only*, during the year 1944.

Industrial Briefs . . .

• CONSULTING SERVICE—W. B. Brooks of the Alloys Development Co., Pittsburgh, has announced the establishment of a metallurgical consulting service making available a broad experience in stainless and heat resisting steels, materials engineering, industrial corrosion, low alloy constructional steels, welding, and radiography.

• NEW MANAGEMENT — It has been announced that Sterling, Inc., Milwaukee, manufacturers of Sterlco heating specialties, controls, and pumps is now under new management. The stock of the company has been purchased by a group of well-known Milwaukee businessmen. Two of the new owners will be active in the management of the company. Paul A. West will direct the sales along with his duties as president of the new company and John B. Ballard will be vice-president in charge of manufacturing.

• NEW STAMPING FIRM—Sherman Products, Inc., Waukesha, Wis., steel stampings, has begun operations. D. W. Sherman, chief engineer of the automobile division of the A. O. Smith Corp., is president.

• SETS NEW RECORDS — Kaiser Co., Inc., established new production records in every department of its Fontana, Calif., plant during May. The blast furnace produced the record tonnage of 41,529 net tons of pig iron and the openhearth shop produced 68,138 net tons of ingots.

• EXPANSION PROGRAM — Allis-Chalmers Mfg. Co., Milwaukee, has announced a construction and expansion program to cost several million dollars for its Pittsburgh works. The first major expansion of the Pittsburgh property will include a new 250 by 400 ft building which will be devoted largely to production of transformers. Construction will begin July 1 and is expected to be completed about Nov. 1.

• REBUILDS FURNACE — Rebuilt in 123 days, Duquesne Works' old No. 6 blast furnace is making iron again at this U. S. Steel plant, continuing a 41-year career. The complete rebuilding boosted her rated capacity 69 tons, to better than 700 tons a day.

• COMPLETES EXPANSION — The Sawhill Mfg. Co. has recently completed a plant expansion program at Sharon, Pa. Sawhill specializes in the production of prefabricated pipe.

• NEW APPOINTMENT—Lt. Col. S. C. Guillan has been appointed secretary of the British Institute of Metals and editor of its publications. He will take up his duties with effect from July 1, 1947.

• LIGHTNING CENTER — Construction has begun at General Electric's Pittsfield Works on a high-voltage laboratory to cost over a million dollars. When used with existing GE facilities, it will create the world's largest man-made lightning center. The new building is scheduled for completion in March 1948.

• DEVELOPS STEELS—A series of four improved carburizing steels has been developed by Carnegie-Illinois Steel Corp. Marketed as USS SuperKore, these deep hardening steels can be easily processed and machined into airplane, truck, bus and other gears, shafts and pinions subject to heavy duty service. They are fundamentally designed to cut both material and manufacturing costs.

• OPENS OXYGEN PLANTS—Two oxygen manufacturing plants were added to Air Reduction nationwide chain with the opening of new plants at Baton Rouge, La., and Decatur, Ill.

• MODERNIZATION PROGRAM — Final approval was given by A. E. Staley Mfg. Co.'s board of directors to a $10,835,000 modernization program.

AFA Aluminum And Magnesium Division Elects New Officers

Chicago

• • • **The aluminum and magnesium division of American Foundrymen's Assn. has named** Walter Bonsack, Cleveland, chairman for 1947-49, according to Chicago headquarters of the international technical society of the castings industry.

Walter Bonsack

Present secretary and chairman of the reclamation and alloying committee, he was chosen to head the light metals group by its executive committee. He is also active on the shrinkage and porosity, centrifugal casting and test bars committees. Mr. Bonsack is director of laboratories for National Smelting Co., Cleveland.

Named division vice-chairman is Manley E. Brooks, foundry engineer at the Dowmetal foundry of Dow Chemical Co. in Bay City, Mich. Head of the handbook review committee, Mr. Brooks has served on the aluminum and magnesium executive group. His division activities have included association with the investigations of sand, centrifugal and permanent mold casting; casting stability; inspection procedures; reclamation and alloying, and test bars.

Manley E. Brooks

J. C. DeHaven, research engineer at Battelle Memorial Institute, Columbus, Ohio, was elected secretary. Chairman of the shrinkage and porosity committee, he has served on the executive and centrifugal casting groups.

J. C. DeHaven

The new officers will be installed July 1.

Construction Steel . . .

New York

• • • **The estimated total** bookings of fabricated structural steel for the first 5 months of 1947, according to reports received by the American Institute of Steel Construction, Inc., amounted to 634,526 tons, or an increase of 12 pct over the average of 565,436 tons booked in the same months in the averaged 5 prewar years 1936 to 1940. The bookings for May, however, were off to some 107,000 tons.

Shipments for the month of May reported at 136,443 tons continued at the rate established in the first 4 months of this year. The total shipments for the first 5 months amounted to 691,814 tons or 27 pct greater than the averaged shipments in the same 5 months in the 5 prewar years.

The tonnage available for fabrication on May 31 was 628,301 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry 1947	Estimated Total Tonnage for the Entire Industry Avg. 1936-1940
Contracts Closed		
January	104,973	107,578
February	125,881	96,280
March	149.634*	124,558
April	146.568*	110,783
May	107,470	126,237
Total	634,526	565,436
Shipments		
January	140,650	92,578
February	136,126	88,626
March	137,799	115,031
April	140,796*	123,650
May	136,443	123,225
Total	691,814	543,110
Tonnage available for fabrication within the next 4 months	628,301	337,237

*Revised

• • • **Fabricated steel awards** this week included the following:

700 Tons, Omaha, Neb., field house to Omaha Steel Works, Omaha.

690 Tons, State of Wyoming, tunnel project 40-N-7347Y to Consolidated Steel Co., Los Angeles.

600 Tons, White Eagle, Okla., power plant to Kansas City Structural Steel Co., Kansas City, Kan.

550 Tons, State of Wyoming, tunnel project 40-N-7348Y to Consolidated Steel Co., Los Angeles.

500 Tons, Redwood, Miss., beam span, Mississippi State Highway Dept. to Bethlehem Steel Co., Bethlehem.

500 Tons, Corsons Inlet, N. J., bascule span and approachs, Cape May County Bridge Commission, through Brann & Stewart, Philadelphia, to Bethlehem Steel Co., Bethlehem.

500 Tons, Detroit, office building for Michigan Bell Telephone Co. to American Bridge Co., Pittsburgh.

260 Tons, Illinois and New Mexico bridge repairs for Santa Fe R.R., American Bridge Co., Pittsburgh, low bidder.

180 Tons, Wilmington, Del., clubhouse, St. Anthony's Club, to Belmont Iron Works, Phiadephia.

140 Tons, Mahaska County, Iowa, bridge for State of Iowa to Pittsburgh-Des Moines Steel Co., Pittsburgh.

115 Tons, Twin Falls, Idaho, bidder span for the Union Pacific R.R. to American Bridge Co., Pittsburgh.

• • • **Fabricated steel inquiries** this week included the following:

4500 Tons, Mississippi River Locks No. 27, to River Construction Co., New York, general contractor. Previously reported as low bidder.

2900 Tons, City of New York, elevated railway.

550 Tons, Philadelphia, General Motors Truck Corp., building, rebid June 25.

190 Tons, Philadelphia, Hardwick & Magee, building, bids in.

180 Tons, Philadelphia, City Line Center, building, due June 27.

100 Tons, Crescent City, Calif., bridge across South Fork of Smith River, California Div. of Highways, Sacramento, bids to July 16.

• • • **Reinforcing bar awards** this week included the following:

875 Tons, branch department store for Famous Barr Co. through Westlake Construction Co., general contractors, to Laclede Steel Co., St. Louis.

600 Tons, factory and garage, for Western Electric Co. through Austin Co., general contractors, to Laclede Steel Co., St. Louis.

500 Tons, Hot Springs, S. D., Fall River channel improvements to Peter Kiewit & Sons., Sheridan, Wyo.

300 Tons, Dubuque, Iowa, Xavier Hospital through Tunnicliff Construction Co., Davenport, Iowa, to Concrete Steel Co., New York.

275 Tons, South Boston, bakery for Bakeries Inc. to Concrete Steel Co., Boston.

150 Tons, Bellview, Neb., power house through Bates & Rogers Construction Corp. to Inland Steel Co., Chicago.

115 Tons, Minneapolis, city auditorium through H. N. Lieghton Co., Minneapolis, to Bethlehem Steel Co., Bethlehem.

100 Tons, Savannah, Ga., plant for Union Bag & Paper Corp. to Concrete Steel Co., Boston, by Morton C. Tuttle Co., Boston engineers.

• • • **Reinforcing bar inquiries** this week included the following:

1500 Tons, Mississippi River Locks No. 27, to River Construction Co., New York, general contractor. Previously reported as low bidder.

350 Tons, Chicago, 83rd St. grade separation, Ready Coal & Construction Co., low bidder.

300 Tons, Southeast Missouri Teachers college, Cape Girardeau dormitory. Bids due June 25.

225 Tons, Lehi, Utah, Jordan Narrows pumping plant, Bureau of Reclamation, Provo, Utah, Spec. 1876, bids to July 10.

190 Tons, Chicago, power building.

165 Tons, Gila Co., Ariz., Pinto Creek bridge on Superior-Miami highway, Arizona State Highway Commission, Phoenix, bids to July 15.

115 Tons, Porterville, Calif., bridge across Tule River, California Div. of Highways, Sacramento, bids to July 16.

100 Tons, Cambridge, Mass., plant for New England Gas & Electric Assn.

• • • **Sheet piling inquiries** this week included the following:

1650 Tons, Sault Ste. Marie, Mich., power house for U. S. Engineers.

• • • **Railroad car awards** this week included the following:

Santa Fe R.R. has placed an order for 225 hopper cars with Pullman Standard Car Mfg. Co. at Butler, Pa.

• • • **Railroad car inquiries** this week included the following:

Union Pacific R.R. is inquiring for 1600 50-ton box cars. The Wheeling & Lake Erie R.R. is inquiring for 1000 70-ton hopper cars.

WAA Lists Additional Machine Tools to Be Disposed of as Scrap

Washington

• • • **Continuing its efforts** to dispose of "unsalable special machinery" as salvage or scrap, WAA has listed nearly two score additional types of special purpose machine tools for such disposal.

Identified as to manufacturer and type of machine, the additional tools to be scrapped are as follows: Avery Drilling Machine Co., No. 4 drills; Cross Gear Machine Co., Nos. 6, 7, 8, 9 and 10 special shell-making milling machines; Charles F. Elmes Engineering Co., special cartridge cases presses and special nosing presses; Engineering & Research Corp., 75, 150, and 300-ton stretching presses, and propeller profiling machines.

Also Fellows Gear Shaper Co., discing shapers; Greenlee Bros. Co., automatic, horizontal, vertical and angular, hydraulic feed, multiple operation, single purpose, special indexing machines; Lehmann Machine Co., 24-in. special shell-making hydrotel lathes; Seneca Falls Machine Co., Loswing lathes, Model LS and special models U and LS; Van Norman Machine Tool Co., No. 100 contour milling machines, and Sundstrand Machine Tool Co., angular sliding head mills, duplex spot face mills, and special single purpose aircraft engine milling machines (mill type planers, slotting machines, table type milling machines, and vertical milling machines).

MACHINE TOOLS

. . . News and Market Activities

Firm Orders for Machine Tools Said to Be Holding Ground

• • • **Although cancellations** are increasing, according to reliable sources in the machine tool trade, new firm orders have yet to reach the low ebb predicted by some observers 90 days ago.

The general uncertainty of business conditions and the approaching machine tool show will probably shape to some extent the new firm order pattern for the rest of June and through July, but the strong underlying trend in capital goods is expected to prevent the machine tool business from hitting the bottom during this period.

In Cincinnati, Harvey H. Goldman, president, Machinery Dealers' National Assn., opening the sixth annual convention of the group, leveled charges of inefficiency and bungling against War Assets Administration in its disposal of surplus machine tools.

His complaints against WAA included the point that some 300 government-owned warehouses were partially empty and should be sold to private enterprise and that the government was "dumping" certain items on the market in its effort to get rid of them.

Mr. Goldman who recently conferred with H. H. Stewart, Deputy Administrator for General Disposal and Mr. Throckmorton, head of the Machine Tool Div. under WAA, reported that WAA is disturbed about certain practices which they consider unfair, including the government paying commissions and discounts to dealers for selling machines for which there is a most active demand.

He said also that criticism is building up as a result of site sales and their attendant confusion and discrimination, and lack of cooperation on the part of dealers in selling machine tools readily available and not paying attention to tools that are actually in long supply.

On another front, veto of the tax bill has stirred machine tool and process equipment manufacturers to obtain reconsideration of Treasury Dept. policies on depreciation of capital assets. Their efforts are primarily concerned with obtaining a revision of Section 102 of Treasury regulations.

Charges of Bungling Are Made Against WAA in Surplus Machine Disposals

A spokesman for the machine tool industry pointed to the immediate need to recognize the importance of tool obsolescence in revising policies. It was further pointed out that "nobody can tell when any machine tool may become obsolete. Somebody may find a better way of doing the same job any tool is doing on the same job tomorrow morning.

"The average life of a machine tool in this industry is only 7 years. If we are to be governed by the average, a machine tool could be replaced by a newer model, with advantage, every 7 years. The logical thing to do then is to recover the money invested in that machine tool out of the earnings of the first 7 or 10 years of its life, but the Treasury Dept. does not like us to do that."

In Detroit there are indications that new tooling programs for the production of automatic transmissions are finally getting under way. Several auto makers are requesting quotations on new transmission machines and this, together with inquiries for machines to replace worn-out equipment, has brightened an otherwise dull machine tool outlook.

Packard is requesting quotations on special equipment to be used for a new transmission. GM's Detroit transmission division is planning a new building that will be used, it is rumored, to produce two new transmissions. Presumably one of these will be built for Pontiac, the other for Buick. There are indications that the Buick transmission plans will call for production as early as November.

Oldsmobile, another GM division, is asking for quotations on extensive machine tool equipment.

Ford and Chevrolet Gear and Axle are reported to be ordering a substantial quantity of new machines for replacement.

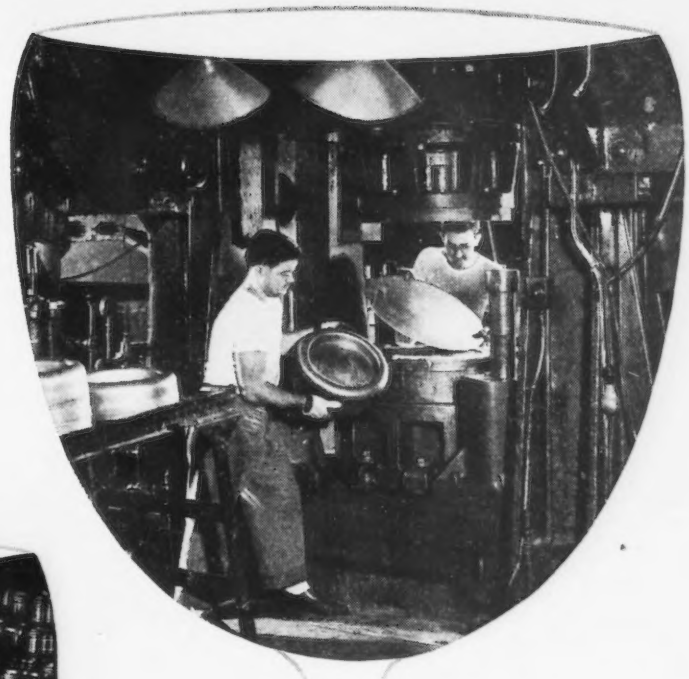
The question as to when new automobile models will be introduced remains as great a mystery as ever. Most sources here believe that as long as substantial banks of orders for new cars remain on the books and raw materials are in short supply, changeovers will be delayed until the last possible moment. The present machine tool activity, they reason, is so that everything will be ready when the time comes to change models. Most observers here feel it may be well into 1948 and possibly 1949 before all the major producers have changed from present models.

In Philadelphia, trade sources report that business continues at a reasonable level although below the volume of the early months of the year. There is the presumption that buyers are holding back to some extent to see what tools are placed on display at the coming show. The cost of tools now based on higher labor and materials costs is so high as to require careful consideration by prospective buyers before placing orders. Moreover, there is the added possibility of obtaining nearly equivalent tools from WAA reserves. In some instances, material savings have been made by such purchases despite the difficulty in finding and obtaining the equipment.

In the Boston sector business is quiet, but by no means flat, and sales of new tools at new higher prices are being reported. Detailed information about first half export business is withheld, but it is admitted that second quarter sales ran ahead of first and they previously admitted first quarter were pretty good. They add that like domestic, the export market has slowed down the past 2 weeks.

You Can Draw More than Beer

from these STAINLESS STEEL BARRELS...



STAINLESS STEEL SIMPLIFIES PRODUCTION . . . The high ductility of "18-8" makes severe drawing operations easy. Here, one man places a stainless steel blank in the press, while the other stacks a stamping.

COMPONENT PARTS OF BARRELS ON WAY TO WELDERS . . . Tops, shown at left, bottoms, at center, and middle sections, on upper right, move on huge conveyor belts to welding department, to be joined together into a finished Firestone product.

● **Yes, you can draw the mighty valuable conclusions that . . .** "18-8" stainless steel not only responds readily to forming operations, but also permits ready fabrication by welding.

The high ductility of "18-8" assures three basic advantages: it makes deep drawing easy, it results in more uniform draws, and it enables forming a wide variety of shapes with minimum rejects.

Moreover, "18-8" chromium-Nickel stainless steel helps you cut bulk and deadweight from a product without sacrificing its strength or durability. For example, long-lasting, stainless steel barrels produced by Firestone Steel Products Division of the Firestone Tire & Rubber Company weigh only 28 pounds each . . . as against 75 pounds for a standard wooden barrel, and 45 pounds for a carbon steel barrel of equal capacity.

Leading steel companies produce stainless steel containing Nickel in tubular, sheet and strip form. A list of the sources of supply will be furnished on request.

EMBLEM OF INCO SERVICE
TRADE MARK

● Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information and data are yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **Buying demand for** copper continues to require all domestic production with imports and Metals Reserve remaining stocks which were reported at the end of May to approximate 16,000 tons. Producers are still unable to supply all domestic requirements. Decline in the brass mill demand due to curtailed requirements for its products and the vacation shutdowns is compensated for by continuing demand from wire and cable mills. Foreign copper continues to be priced at 21.50¢ f.a.s. New York. There is no price change in the domestic market price of copper. The scrap copper market is disorganized and the market for ingot brass and bronze is inactive.

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Zinc

• • • **Zinc producers** report that there is no longer any difficulty in obtaining any grade of zinc including Prime Western. This is a new development in the zinc market where the supply of this grade has been inadequate to meet all requirements for at least several years. There is as yet no indication of price action on primary metal. However, zinc scrap showed increased weakness this week and many grades declined in price.

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Lead

• • • **A strong demand** continues for primary lead and the current price remains firm. Secondary lead is more available now and is selling at discount prices. Antimonial lead scrap is in the same position. A decline in the scrap market often portends a coming decline in the price of primary metal. While some observers have anticipated a decline in the price of lead for some time, there is no evidence in the current demand for primary lead which would support the prospect of a lower price in the immediate future. Current weakness in the ingot metal market is caused by the general apathy of the foundry industry for nonferrous metals.

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Scrap Metals Prices Drop

New York

• • • **Scrap nonferrous metals** continued to decline last week in this market with all ingot producers out of the market and refineries buying only on an occasional basis. Declines in brass and bronze scrap grades were registered up to 1¢ per lb last week. Copper scrap remained unchanged at previous quotations. The basis for the decline was the general lack of interest and the fact that the refineries pay only for the copper content of the scrap at the rate of 13⅝¢ per unit, deducting a charge of $5 per ton for smelting. In general, mills are buying only from plants and not from the dealers, it is said.

A similar situation exists in the aluminum scrap market with declines in some grades registered up to 1½¢ per lb. Dealers have been cautioned to buy scrap at prices which are the equivalent of cast grades for resale at 6¢ per lb.

Nickel and Monel scrap has also declined by as much as 2¢ per lb in some grades. The underlying causes of the drop in these types of scrap are the same as above. The price of block tin scrap has declined by 3¢ to 4¢ per lb because of the unwillingness of the smelters to buy on the basis of 80¢ tin.

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Ingot Metals Prices Drop

• • • **Brass and bronze** ingot prices dropped on Monday and aluminum ingot prices on June 18. The price decline in the 85-5-5-5 grades was 1½¢. Other grades declined between 1¢ and 1¾¢ per lb.

The price decreases in the aluminum ingots covered all grades except the low copper alloys and included steel deoxidizing grades except No. 1. Price decreases ranged from ½¢ to ¾¢ per lb.

The price adjustments in these remelted metals is primarily caused by the current decline in orders on nonferrous foundries which has caused a complete absence of buying interest in remelted metals.

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Aluminum Institute Reelects J. B. Neiman

Chicago

• • • **At the annual** meeting of the Aluminum Research Institute, held recently at French Lick Springs Hotel in French Lick, Ind., J. B. Neiman, Federated Metals Div. of the American Smelting & Refining Co., was reelected president of the group.

J. B. Neiman

Mr. Neiman has continuously headed the Aluminum Research Institute, which represents more than 80 pct of the ingot aluminum capacity of the United States since the early part of 1941. He is general manager of all the aluminum departments of Federated Metals Div. of the American Smelting & Refining Co.

Nonferrous Metals Prices

Cents per pound

	June 18	June 19	June 20	June 21	June 23	June 24
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$85 to $95
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$85.00 to $87.00
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$53 to $56
Silver, New York, cents per oz.	59.75
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	18.00
No. 120	17.50
No. 123	17.00
80-10-10 ingot	
No. 305	22.00
No. 315	20.00
88-10-2 ingot	
No. 210	27.75
No. 215	26.25
No. 245	20.25
Yellow ingot	
No. 405	14.50
Manganese Bronze	
No. 421	16.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	13.75
No. 12 alum. (No. 2 grade)	13.25
108 alloy	13.50
195 alloy	14.25
AXS-679	13.75
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	12.50
Grade 3—90 pct-92 pct	11.75
Grade 4—85 pct-90 pct	11.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32⅜
Rolled, oval, straight, delivered	32⅞
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz lots, per troy oz.	75¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	60⅜
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢ 38 to 40, 75.5¢ 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢ 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14¼
Loose yellow brass trimmings	15⅛

Copper and Brass

No. 1 heavy copper and wire	14½—15
No. 2 heavy copper and wire	13½—14
Light copper	12½—13
Auto radiators (unsweated)	8½— 9
No. 1 composition	10½—11
No. 1 composition turnings	10 —10½
Clean red car boxes	9 — 9½
Cocks and faucets	9 — 9½
Mixed heavy yellow brass	7 — 7¼
Old rolled brass	7 — 7¼
Brass pipe	8½— 9
New soft brass clippings	10½—11
Brass rod ends	9½—10
No. 1 brass rod turnings	8½— 9

Aluminum

Alum. pistons free of struts	4 — 4½
Aluminum crankcases	5 — 5½
2S aluminum clippings	7 — 7⅛
Old sheet & utensils	5½— 6
Mixed borings and turnings	—2
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½

Zinc

New zinc clippings	6 — 6½
Old zinc	4¼— 4½
Zinc routings	1½— 2
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	15½—17½
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	17 —18
New Monel clippings	10 —10½
Clean Monel turnings	7 — 8
Old sheet Monel	9½—10
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
German silver clippings, mixed	7½— 8
German silver turnings, mixed	5½— 6

Lead

Soft scrap lead	10 —10½
Battery plates (dry)	5 — 5½

Magnesium Alloys

Segregated solids	8
Castings	5

Miscellaneous

Block tin	63 —65
No. 1 pewter	50 —52
No. 1 auto babbitt	38 —40
Mixed common babbitt	11½—12
Solder joints	12 —13
Siphon tops	38 —39
Small foundry type	13 —13½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	10 —10½
New type shell cuttings	10½—11
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

SCRAP

. . . News and Market Activities

Some Prices Up; Long-Distance Buys Grow

New York

• • • **Price increases** in some districts coupled with a very firm tone in others gave the market definite signs of price strength again this week. On top of this are scattered reports of a revival of the cross-hauling and long distance buying sprees that featured the booming market of early spring.

Increases in average quotations of No. 1 steel ranged from $1 at Pittsburgh to $3.50 at Philadelphia. Boston, New York, St. Louis and Cincinnati also posted advances in this grade. Generally speaking, cast prices moved little.

Reports that mills are going out of their normal buying areas in search of scrap came this week from Chicago, Birmingham, St. Louis and Buffalo. If this practice continues to grow observers believe it may cause a return to the high prices seen early this year. If not, it is still likely to produce a great spread between local and out-of-district prices. Where the latter become a significant proportion of the total, price quotations will have to reflect it. This would mean THE IRON AGE quotations would again show a spread between local and out-of-district material in order to reflect the proper average buying prices.

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PITTSBURGH — The market here is stronger due to scarcity and strength in other marketing areas. Mills here are willing to buy but scrap interests will not sell short and few are covered and in a position to sell. The quoted price is no particular indication of the availability of scrap, because at practically any price within reason a broker would find himself in a squeeze to deliver any substantial tonnages. Good railroad scrap is in strong demand at prices far in excess of those for openhearth grades, further evidencing the fact that the scrap and not the price is the main factor in the present market.

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CHICAGO — The chief reason the market failed to advance in the last week was the reluctance by dealers and brokers to sell. Strength in other areas has already caused higher prices to be paid by the brokers to cover old orders, but consumers haven't yet indicated how much higher they are willing to go on new contracts. The return to the chaotic conditions of early this year is freely predicted in many quarters. At least one consumer is ready to meet eastern mill prices for Indiana scrap. Cross hauling and raiding of out-of-district areas is again threatening Chicago supply in practically all directions.

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PHILADELPHIA — Scrap prices are quoted higher in this district based on broker-dealer transactions. Heavy melting grades are quoted at $3.50 higher than last week, No. 1 at $37.00 to $37.50. Machine shop turnings are quoted at $27.50 to $29.00. Cast scrap is up $2 per ton on sales to consumers. Railroad malleable sold at $52 to $53. When broker accumulations of scrap are sufficient, it is the opinion of market observers that current high prices will be confirmed by mill purchases at these or higher levels.

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NEW YORK—Steel scrap prices moved up another $1 this week. The $5 increase in the past 2 weeks has increased supply, and volume moving is reported good. At these prices it is expected to stay good—at least until some accumulated stocks have been worked off. Buying pattern is still normal: most steelmaking grades are going to eastern Pennsylvania though Pittsburgh is getting some. Cast, except chemical borings, was unchanged.

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DETROIT — The market is stronger here again this week, partly in response to buying activities in other scrap centers and the possibility that a coal strike may occur at the expiration of the miners' vacations. Turnings and borings which were not raised with openhearth grades are up this week $1 to $2 per ton. Demand for low phos plate is also strong. Speculation is divided here as to the possible effect of a coal strike on the Detroit market. If a freight embargo is called, some sources believe a larger share of Detroit industrial scrap will remain here, offsetting the additional scrap likely to be needed to replace hot metal in the openhearth. Cast grades remain firm.

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CLEVELAND—There has been very little change in the scrap market here; demand is strong and most grades, particularly electric furnace, are moving freely. In some cases, several prices are being paid for identical grades and brokers are shipping one for one on the old and the new orders.

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BOSTON—Pennsylvania mills are buying. Brokers are paying $30 to $31, mostly $31 to fill heavy steel orders, up $3 to $4 for the week, and only $5 under the 1947 peak price. Supplies have tightened with the advance and some brokers already are "short" the market. Other scrap grades are up, too. The fact foundries close early in July for vacation and overhauling may be basis for recent softening in cast values.

BUFFALO—Bullish sentiment in the local market was heightened this week by the blowing out of a 750-ton blast furnace for relining by one of the leading openhearth operators. Prices were unchanged down the line but it was doubted that new business could be booked in any volume at current levels. Movement of scrap to yards continued to decline and a fair tonnage was reported going out of the district in factory consignments to mills under reciprocity agreements.

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CINCINNATI—The market this week continued upward as buyers remained active. All grades are in good demand and dealers and brokers are busy trying to keep abreast with the growing demands.

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BIRMINGHAM—Demand for all types of material is terrific here as the coal strike deadline nears but movement in this immediate area is relatively slow. Heavy tonnages are reported moving from Gulf ports to northern mills where higher prices are obtainable. Prices in the Birmingham market are unchanged from an advance June 16 that included a rise of $4 per ton for openhearth grades.

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ST. LOUIS—A leading steel mill came into the market with an order for an estimated 10,000 to 12,000 tons of No. 2 heavy melting steel and bundled sheets at $31 per gross ton. However, this did not move other mills in the district to make purchases on the same basis. Increased drives for scrap by Pittsburgh and Chicago factors into southern Illinois, a territory which usually ships to St. Louis has narrowed shipments to this market.

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TORONTO—Canada's price ceiling on scrap iron and steel remains and the supply situation is becoming more critical. Dealers state that their costs have increased steadily since the time ceilings were established on scrap in 1942 and today they have reached a level where there is no profit, but quite often a loss, for those seeking scrap in the rural districts and especially the farm communities where large quantities are still available. Leaders in the steel industry state that unless scrap becomes more plentiful in the very early future, Canada's steel production will be seriously affected.

Yard Gets New Crane

Washington

• • • **Joseph Smith & Sons, Washington scrap dealers, report that erection of a P & H 10-ton heavy duty magnet crane has stepped up yard production 25 to 30 pct. The new unit has a 110-ft span 30 ft from the ground and is mounted on a 300-ft runway. Loads on the 65-in. magnet range from 1 to 2 tons depending on the material handled.**

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$35.50 to $36.00
RR. hvy. melting	38.50 to 39.00
No. 2 hvy. melting	35.50 to 36.00
RR. scrap rails	40.00 to 41.00
Rails 2 ft. and under	44.25 to 45.00
No. 1 comp'd bundles	35.50 to 36.00
Hand bdld. new shts.	35.50 to 36.00
Hvy. axle turn.	35.00 to 35.50
Hvy. steel forge turn.	35.00 to 35.50
Mach. shop turn.	30.00 to 30.50
Shoveling turn.	31.50 to 32.00
Mixed bor. and turn.	30.00 to 30.50
Cast iron borings	31.00 to 31.50
No. 1 cupola cast	36.00 to 37.00
Heavy breakable cast	32.50 to 33.00
Malleable	50.00 to 51.00
RR. knuck and coup	43.50 to 44.50
RR. coil springs	43.50 to 44.50
RR. leaf springs	43.50 to 44.50
Rolled steel wheels	43.50 to 44.50
Low phos.	39.00 to 40.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $31.50
No. 2 hvy. melting	30.00 to 30.50
No. 1 bundles	31.00 to 31.50
No. 2 dealers' bundles	30.00 to 30.50
Bundled mach. shop turn.	30.00 to 30.50
Galv. bundles	28.00 to 28.50
Mach. shop turn.	26.00 to 26.50
Short shov. turn.	27.50 to 28.00
Cast iron borings	26.00 to 27.00
Mix. borings & turn.	26.00 to 26.50
Low phos. hvy. forge	35.00 to 36.00
Low phos. plates	33.00 to 34.50
No. 1 RR. hvy. melt.	33.50 to 34.00
Rerolling rails	39.50 to 40.00
Miscellaneous rails	37.00 to 37.50
Angles & splice bars	40.00 to 40.50
Locomotive tires, cut	39.50 to 40.00
Cut bolster & side frames	36.50 to 37.00
Standard stl. car axles	42.50 to 43.00
No. 3 steel wheels	37.50 to 38.00
Couplers & knuckles	39.00 to 40.00
Malleable	54.50 to 56.50
No. 1 mach. cast	42.00 to 44.00
Rails 2 ft. and under	41.00 to 42.00
No. 1 agricul. cast.	39.00 to 39.50
Hvy. breakable cast.	34.00 to 34.50
RR. grate bars	34.50 to 35.00
Cast iron brake shoes	38.00 to 38.50
Cast iron carwheels	38.00 to 40.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	31.00 to 32.00
Mach. shop turn.	26.00 to 27.00
Shoveling turn.	28.00 to 29.00
Cast iron borings	27.00 to 28.00
Mixed bor. & turn.	26.00 to 27.00
Low phos. plate	41.00 to 42.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast.	37.00 to 38.00
Scrap rails	40.00 to 41.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	30.00 to 31.00
Nos. 1 and 2 bundles	30.00 to 31.00
Busheling	30.00 to 31.00
Shoveling turn.	23.00 to 23.50
Machine shop turn.	21.50 to 22.00
Mixed bor. & turn.	21.00 to 21.50
Cl'n cast. chem. bor.	25.00 to 25.50
No. 1 machinery cast.	40.00 to 46.00
No. 2 machinery cast.	40.00 to 46.00
Heavy breakable cast.	39.00 to 43.00
Stove plate	40.00 to 46.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$29.75 to $30.25
No. 2 hvy. melting	29.75 to 30.25
No. 1 bundles	29.75 to 30.25
New busheling	29.75 to 30.25
Flashings	29.75 to 30.25
Mach. shop turn.	22.50 to 23.00
Shoveling turn.	24.50 to 25.00
Cast iron borings	24.50 to 25.00
Mixed bor. & turn.	23.50 to 24.00
Low phos. plate	33.75 to 34.25
No. 1 cupola cast.	35.00 to 37.00
Hvy. breakable cast.	26.00 to 28.50
Stove plate	30.00 to 32.00
Automotive cast.	35.00 to 37.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $37.50
No. 2 hvy. melting	36.00 to 36.50
No. 1 bundles	37.00 to 37.50
No. 2 bundles	36.00 to 37.00
Mach. shop turn.	27.50 to 29.00
Shoveling turn.	27.50 to 29.00
Mixed bor. & turn.	26.00 to 27.00
Clean cast chemical bor.	31.00 to 33.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	44.00 to 45.00
Cast. charging box	44.00 to 45.00
Clean auto cast.	46.00 to 47.00
Hvy. axle forge turn.	36.00 to 36.50
Low phos. plate	40.50 to 41.00
Low phos. punchings	40.50 to 41.00
Low phos. bundles	39.50 to 40.00
RR. steel wheels	41.00 to 42.00
RR. coil springs	41.00 to 42.00
RR. malleable	52.00 to 53.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy, melting	$32.00 to $33.00
No. 2 hvy. melting	30.00 to 31.00
Bundled sheets	30.00 to 31.00
Mach. shop turn.	20.00 to 21.00
Locomotive tires, uncut	33.00 to 34.00
Mis. std. sec. rails	33.00 to 34.00
Rerolling rails	35.00 to 36.00
Steel angle bars	36.00 to 37.00
Rails 3 ft. and under	34.00 to 35.00
RR. steel springs	36.00 to 37.00
Steel car axles	37.00 to 38.00
Stove plate	32.00 to 33.00
Grate bars	32.00 to 33.00
Brake shoes	32.00 to 33.00
Malleable	52.00 to 53.00
Cast iron car wheels	40.00 to 41.00
No. 1 machinery cast.	36.00 to 37.00
Breakable cast.	32.00 to 33.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.00
No. 2 hvy. melting	30.50 to 31.00
No. 2 bundles	30.50 to 31.00
No. 1 busheling	30.50 to 31.00
Long turnings	22.00
Shoveling turnings	24.00
Cast iron borings	23.00
Bar crops and plate	31.00 to 32.00
Structural and plate	31.00 to 32.00
No. 1 cast	38.00 to 39.00
Stove plate	34.00 to 35.00
No. 1 RR. hvy. melt.	31.50 to 32.00
Steel axles	31.50 to 32.00
Scrap rails	31.50 to 32.00
Rerolling rails	35.00 to 36.00
Angles & splice bars	33.00 to 34.00
Rails 3 ft. & under	33.00 to 34.00
Cast iron carwheels	32.00 to 34.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.50 to $35.00
No. 2 hvy. melting	34.50 to 35.00
Mach. shop turn.	28.50 to 29.00
Short shov. turn.	29.50 to 30.00
Cast iron borings	29.50 to 30.00
Low phos.	38.50 to 39.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	31.00 to 32.00
No. 2 bundles	31.00 to 32.00
Comp. galv. bundles	31.00 to 32.00
Mach. shop turn.	23.00 to 24.00
Mixed bor. & turn.	23.00 to 24.00
Shoveling turn.	24.50 to 25.00
No. 1 cupola cast	39.00 to 40.00
Hvy. breakable cast.	37.00 to 38.00
Charging box cast.	37.50 to 38.50
Stove plate	37.50 to 38.50
Clean auto cast.	39.00 to 40.00
Unstrip. motor blks.	35.00 to 36.00
Cl'n chem. cast bor.	25.00 to 25.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	31.00 to 32.00
Mach. shop turn.	21.00 to 22.00
Shoveling turn.	24.00 to 25.00
Cast iron borings	22.00 to 23.00
Mixed bor. & turn.	22.00 to 23.00
No. 1 cupola cast	35.00 to 38.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 38.00
Malleable	37.00 to 39.00
Low phos. plate	34.00 to 36.00
Scrap rails	33.00 to 36.00
Rails 3 ft & under	38.00 to 40.00
RR. steel wheels	38.00 to 40.00
Cast iron carwheels	38.00 to 40.00
RR. coil & leaf spgs.	38.00 to 40.00
RR. knuckles & coup	38.00 to 40.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$33.50 to $34.00
No. 2 hvy. melting	33.50 to 34.00
Compressed sheet stl.	33.50 to 34.00
Drop forge flashings	33.50 to 34.00
No. 2 bundles	33.50 to 34.00
Mach. shop turn.	28.50 to 29.00
Shoveling turn.	29.50 to 30.00
No. 1 busheling	33.50 to 34.00
Steel axle turn.	33.50 to 34.00
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	27.00 to 27.50
Low phos.	36.50 to 37.00
No. 1 machinery cast.	40.00 to 42.00
Malleable	55.00 to 57.00
RR. cast.	43.00 to 45.00
Railroad grate bars	38.00 to 39.00
Stove plate	39.00 to 40.00
RR. hvy. melting	36.00 to 38.00
Rails 3 ft. & under	44.00 to 45.00
Rails 18 in. & under	45.00 to 46.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	25.00
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast.	$35.00 to 36.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$20.00
Elec. furn. 1 ft. und.	$23.50 to 25.00
No. 1 cupola cast.	27.50 to 29.00
RR. hvy. melting	21.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price.

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	June 24, 1947	June 17, 1947	May 27, 1947	June 25, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.425
Cold-rolled sheets	3.20	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.55	3.55	3.55	4.05*
Hot-rolled strip	2.50	2.50	2.50	2.35
Cold-rolled strip	3.20	3.20	3.20	3.05
Plates	2.65	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302) *24 ga	30.30	30.30	30.30	30.30
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.50
Cold-finished bars	3.20	3.20	3.20	3.10
Alloy bars	3.05	3.05	3.05	2.92
Structural shapes	2.50	2.50	2.50	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	6.15	6.15	6.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.30	3.05
Wire nails	3.75	3.75	3.75	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.39*
Light rails *per net ton	2.85	2.85	2.85	49.18*
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$42.00	$39.00
Sheet bars	50.00	50.00	50.00	38.00
Slabs, rerolling	42.00	42.00	42.00	39.00
Forging billets	50.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.30
Skelp	2.35	2.35	2.35	2.05

Pig Iron: (per gross ton)	June 24, 1947	June 17, 1947	May 27, 1947	June 25, 1946
No. 2, foundry, Phila.	$36.51	$36.51	$36.51	$28.34
No. 2, Valley furnace	33.50	33.50	33.50	26.50
No. 2, Southern, Cin'ti	34.75	34.75	34.75	26.94
No. 2, Birmingham	29.88	29.88	29.88	22.88
No. 2, foundry, Chicago†	33.00	33.00	33.00	26.50
Basic, del'd eastern Pa.	36.92	36.92	36.92	27.84
Basic, Valley furnace	33.00	33.00	33.00	26.00
Malleable, Chicago†	33.50	33.50	33.50	26.50
Malleable, Valley	33.50	33.50	33.50	26.50
Charcoal, Chicago	45.99	45.99	45.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$35.75	$34.75	$32.25	$20.00
Heavy melt'g steel, Phila.	37.25	33.75	29.75	18.75
Heavy melt'g steel, Ch'go	31.25	31.25	29.25	18.75
No. 1, hy. comp. sheet, Det.	30.00	30.00	27.00	17.32
Low phos, Youngs'n	38.75	35.75	35.75	22.50
No. 1, cast, Pittsburgh	36.50	36.50	36.50	20.00
No. 1, cast, Philadelphia	46.50	44.50	41.00	20.00
No. 1, cast, Chicago	43.00	43.00	37.25	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$10.50	$10.50	$10.50	$7.50
Foundry coke, prompt	11.25	11.25	11.25	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	23.00	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 24, 1947	2.85664¢ per lb.	$33.15 per gross ton	$34.75 per gross ton
One week ago	2.85664¢ per lb.	$33.15 per gross ton	$33.25 per gross ton
One month ago	2.85664¢ per lb.	$33.15 per gross ton	$30.42 per gross ton
One year ago	2.73011¢ per lb.	$26.12 per gross ton	$19.17 per gross ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1947	2.85664¢	2.85664¢	$33.15 Mar. 11	$30.14 Jan. 7	$39.67 Mar. 18	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 66 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound of dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices: includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Some sales are at higher prices. (17) Delivered Los Angeles; add ½c per 100 lb for San Francisco. (18) Delivered Los Angeles only.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00						(Canton = $52.00)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo = $53.20) $42.00	$42.00					$45.00		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo = $61.20, Duluth = $52.00[13]) $50.00						$53.00		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton = $61.00)						$64.00		
SHEET BARS							$53.00		Portsmouth, Ohio = $67.20						
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville = 2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢		(Worcester = 2.65¢)					3.27¢[13]			
SHEETS Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢		3.24¢[17]	2.65¢	2.79¢	2.70¢
Cold-rolled[1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢			4.32¢[17]		3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP Hot-rolled[3]	2.50¢	2.50¢	2.50¢	2.50¢[15]	2.50¢		2.50¢						2.65¢	2.93¢	2.88¢
Cold-rolled[4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester = 3.40¢)			3.35¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							3.09¢	
TINPLATE Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio = $5.75)			$6.157	$6.062[11]
Electro, box 0.25 lb.	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb.	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage[5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢		(Warren, Ohio = $5.75)			3.99¢	3.90¢
BLACKPLATE, CANMAKING 55 lb. to 70 lb.	Deduct $1.55 from standard coke base box.														
75 lb. to 95 lb.	Deduct $1.65 from standard coke base box.														
100 lb. to 118 lb.	Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢	2.98¢
Rail steel[6, 16]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢									
Reinforcing (billet)[7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢		2.74¢	2.65¢
Reinforcing (rail)[7, 16]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢								
Cold-finished[8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢							3.35¢	3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton = 3.05¢)					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.95¢		
PLATE Carbon steel[12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Coatesville, Claymont = 2.80¢, Geneva, Utah = 2.80¢) 2.65¢				3.46¢[14]		2.87¢	2.85¢
Floor plates	3.90¢	3.90¢												4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville = 4.10¢)									4.01¢	3.895¢
SHAPES, Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah = 2.65¢) (Bethlehem = 2.50¢)					3.17¢[18]		2.70¢	2.64¢
SPRING STEEL, C-R 0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester = 3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester = 4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester = 5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester = 7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester = 9.30¢)								
MANUFACTURERS' WIRE[9] Bright[10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester = 3.40¢, Duluth = 3.35¢)					5.63¢[13]		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢	(Worcester = 4.35¢, Duluth = 4.50¢) (Trenton = 4.50¢)							5.24¢[13]		4.66¢	4.595¢
PILING, Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Base per lb
18	4	1	—	74¢
1.5	4	1.5	8	59¢
6	4	2	6	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	16¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.75¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa.	2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio; Weirton, W. Va.; St. Louis, Kansas City, Minnequa, Colo.; Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard, galvanized and coated nails	$3.75†	$4.83
Cut nails, carloads, Pittsburgh base	5.30	....

†10¢ additional at Cleveland, 30¢ at Worcester.

	Base per 100 lb	
Annealed fence wire	$3.95‡	$4.96
Annealed galv. fence wire	4.40‡	5.41

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base	column
Woven wire fence*	84	107
Fence posts, carloads	90††	..
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	90	....

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	Y-50	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.85
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.75
Galvanized	....	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	....	3.85
Cold-rolled	....	....	4.75	....	....	4.75	4.75	4.75	5.00*	4.75†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	55½	41
¼-in.	58½	45
1 to 3-in.	60½	47½
Wrought Iron, buttweld		
⅛ in.	2	+20
¼-in.	11½	+10
1 and 1¼-in	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Steel, seamless		
2-in.	52	38½
2½ and 3-in.	55	41½
3½ to 6-in.	57	43½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
½-in.	54½	41½
¾-in.	58½	45½
1 to 3-in.	60	48
Wrought Iron, buttweld		
½-in.	6½	+14
¾-in.	12½	+ 8
1 to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD in in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$81.56
6-in. to 24-in. del'd New York	79.80
6-in. to 24-in., Birmingham	71.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	95.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	48
9/16 & ⅝ in. x 6 in. & shorter	50
All larger diam and longer lengths	47
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	40

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
Base discount less case lots		
7/16 in. and smaller		51
½ in. and smaller	50	..
½ in. through 1 in.		48
9/16 in. through 1 in.	49	..
1⅛ in. through 1½ in.	47	46
1⅝ in. and larger	40	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Consumer

Packages, nuts separate	65 and 10
In bulk	75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws

(In packages)	*Percent Off List Consumer*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	56
¾ to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 15¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	29¢ to 31¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200, & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	49¢
Nickel, 150 mesh	51½¢
Silicon, 100 mesh	26¢
Solder powder, 100 mesh	8½¢ plus metal
Stainless steel, 302, minus 100 mesh	75¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$10.00 to $11.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	11.00 to 12.00
Foundry, Byproduct	
Chicago, del'd	$16.10
Chicago, f.o.b.	15.10
New England, del'd	17.25
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, del'd	15.46
Buffalo, del'd	16.14
Ashland, Ohio, f.o.b.	13.35
Painesville, Ohio, f.o.b.	14.60
Erie, del'd	15.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	13.25

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Ohio	$64.00
First quality, Pa., Md., Ky., Mo.	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo.	64.00
Sec. quality, New Jersey	59.00
Sec. quality, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	$70.00
Chicago District	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. Billmeyer, Pa., Millersville, Ohio	10.55

Midwest, add 10¢; Mo. Valley, add 20¢

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		Plates	Standard Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.14	$5.18	$5.29	$4.43	$5.28	$4.44	$4.22	$4.48	$5.13	$8.37	$8.37	$9.88	$9.88
New York	4.22	5.17[1]	5.47	4.62	5.40	4.62	4.37	4.62	5.17	8.42	8.42	9.92	9.92
Boston	4.40	5.22	4.95[12]	4.65	6.36	4.70	4.47	4.62	5.22	8.62	8.62	9.97	9.97
Baltimore	3.89	....	5.14	4.40	....	4.39	4.34	4.45	5.10	....	....	....	....
Norfolk	4.15	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	3.65	....	....	4.05	5.05	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Milwaukee	4.099	4.899[1]	5.249	4.199	....	4.399	4.249	4.249	4.899	8.399	8.399	9.649	9.649
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.75	8.358	8.358	9.35	9.35
Buffalo	3.95	4.65[1]	5.35	4.30	5.25	4.55	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Detroit	4.05	4.85	5.42	4.34	5.24	4.49†	4.42	4.20	4.87	8.51	8.51	9.74	9.74
Cincinnati	3.916	4.716	5.166	....	....	4.553	4.444	4.403	5.053	....	....	....	....
St. Louis	3.999	4.799[1]	5.424	4.199	5.424	4.399	4.249	4.249	5.074	8.574	8.574	9.824	9.824
Pittsburgh	3.95	4.65[1]	5.10	4.05	4.95	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
St. Paul	4.284[7]	5.084[1]	5.434[2]	4.384[7]	....	4.584[7]	4.434[7]	4.434[7]	5.476[6]	....	7.084[6]	....	....
Omaha	4.668	6.118[1]	5.918	4.868	....	5.068	4.918	4.918	5.818	....	....	....	....
Indianapolis	3.84	4.84	5.29	4.24	5.01	4.51	4.36	4.56	5.01	....	....	....	....
Birmingham	3.65[11]	....	5.20	4.00[11]	....	4.30[11]	4.05[11]	4.05[11]	5.58	....	....	....	....
Memphis	4.27	....	5.97	4.72	....	4.92	4.67	4.67	5.78	....	....	....	....
New Orleans	*4.68[11]	5.94[1]	....	4.88[11]	....	5.03[11]	*4.73[11]	*4.83[11]	5.94[6]	....	....	....	....
Los Angeles	5.15	7.00[1]	6.70	5.65	8.35[5]	5.10	5.20	5.10	6.90[14]	10.15	9.35	11.05	11.05
San Francisco	4.70[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.90[8]	4.75[8]	7.00[10]	....	....	....	....
Seattle	4.80[4]	6.75[2]	6.30	5.30[4]	....	5.15[4]	4.95[4]	5.00[4]	7.10[14]	....	9.50[6]	....	10.85[6]
Portland	5.00[4]	....	6.25	5.50[4]	....	5.25[4]	5.10[4]	5.10[4]	7.20	....	9.30[6]	....	....
Salt Lake City	5.65	....	7.10	6.35	....	5.70	5.85	5.95	7.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	34.00	34.50	35.00	35.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	34.00	34.50	35.00	35.50	39.00	Boston	Birdsboro-Steelton	4.82	.....	.....	.....	.....	43.82
Birmingham	29.38	29.88	.....	.....	.....	Brooklyn	Bethlehem	3.00	37.00	37.50	38.00	38.50	.....
Buffalo	32.50	33.00	33.50	.....	.....	Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	42.50
Chicago	32.50	33.00	33.50	34.00	.....	Cincinnati	Birmingham	4.87	34.25	34.75	.....	.....	.....
Cleveland	32.50	33.00	33.50	.....	.....	Jersey City	Bethlehem	1.84	35.84	36.34	36.84	37.34	.....
Duluth	33.00	33.50	34.00	34.50	.....	Jersey City	Birdsboro	2.33	.....	.....	.....	.....	41.33
Erie	32.50	33.00	33.50	34.00	.....	Los Angeles	Provo	5.94	38.94	39.44	.....	.....	.....
Everett	29.00	29.50	30.00	30.50	.....	Mansfield	Cleveland-Toledo	2.33	34.83	35.33	35.83	36.33	.....
Granite City	32.50	33.50	33.50	.....	.....	Philadelphia	Swedeland	1.01	36.01	36.51	37.01	37.51	.....
Neville Island	33.00	33.50	33.50	34.00	.....	Philadelphia	Birdsboro	1.49	.....	.....	.....	.....	40.49
Provo	33.00	33.50	.....	.....	.....	San Francisco	Provo	5.94	38.94	39.44	.....	.....	.....
Sharpsville	33.00	33.50	33.50	34.00	.....	Seattle	Provo	5.94	38.94	39.44	.....	.....	.....
Steelton	34.00	.....	.....	.....	39.00	St. Louis	Granite City	0.75 Arb.	33.25	34.25	34.25	.....	.....
Struthers, Ohio	33.50	.....	.....	.....	.....								
Swedeland	35.00	35.50	36.00	36.50	.....								
Toledo	32.50	33.00	33.50	34.00	.....								
Troy, N. Y.	34.00	34.50	35.00	35.50	39.00								
Youngstown	33.00	33.50	33.50	34.00	.....								

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$42.50; f.o.b. Buffalo—$43.75. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $45.99. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk) $135.00
Less ton lots (packed) 157.00
Delivered Pittsburgh 140.25

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	7.00	7.25	7.80
Ton lots	8.00	8.60	10.50
Less ton lots	8.40	9.00	10.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$43.00	$44.00
F.o.b. Pittsburgh	47.00	48.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk 30
L.c.l. lots 32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads 32
Ton lots 34
Less ton lots 36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk 6.65
Ton lots 7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet 6.75
Ton lots 7.75
Less ton lots 8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $68.00 f.o.b. Keokuk, Iowa; $65.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	16.50	17.85	19.60
97% Si, 1% Fe	16.00	18.25	20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.25	4.50	4.70
Ton lots	5.25	5.85	6.15
Less ton lots	5.65	6.25	6.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	....	....
50% Si	7.80	8.30	8.50
75% Si	10.00	10.30	11.05
80-90% Si	11.30	11.60	12.35
90-95% Si	12.80	13.10	13.80

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.75	22.15	22.25
0.50% C	21.50	21.90	22.00
1.00% C	21.00	21.40	21.50
2.00% C	20.50	20.90	21.00
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr. 4-6% C. 6-9% Si.	16.60	17.00	17.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	21.00	21.40	21.50
Ton lots	22.35	23.00	24.20
Less ton lots	23.35	24.00	25.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	14.00	14.50	16.55
Ton lots	16.10	16.85	19.00
Less ton lots	17.10	17.85	20.00

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.45	20.20
Less ton lots	18.60	19.45	21.20

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	16.00	17.10	19.05
Less ton lots	16.75	17.85	19.80

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	14.25	15.35	17.30
Less ton lots	15.00	16.10	18.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed ... $2.25

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth $2.70
Crucible $2.80
High speed steel (Primos) .. $2.90

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 $1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots $2.50
Less ton lots $2.55

Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo. ..... 95¢

Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo. ..... 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..... 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti $1.23
Less ton lots $1.25

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti $1.35
Less ton lots $1.40

High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton.... $142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton $65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots ..... 17.00¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk ..... 5.50¢

Alsifer, 20% Al, 40% Si, 40% Ft, contract basis, f.o.b. Niagara Falls, carload ..... 6.25¢
Ton lots ..... 6.75¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots ..... 9.00¢
Ton lots ..... 9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17-50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots ..... 35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1 ..... 87.5¢
No. 6 ..... 60¢
No. 79 ..... 45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.

Ton lots, per pound ..... 8.0¢

Deputy Prime Minister Says Britain Is Starved For Fuels and Steel

London

• • • **Six weeks' supreme** effort was called for by Herbert Morrison, British Lord President of the Council, when he told the production story for April and May at a press conference in London recently. In the last 2 months British industry has recovered a good deal of what was lost in the February and March fuel crisis, but the holiday period looms ahead, when many workers will be away and a drop in production will be unavoidable.

Mr. Morrison described the few weeks before the height of the holiday period as extremely valuable. Unless, he said, the workers did supremely well in the next few weeks all hope of achieving the 1947 industrial targets would be lost. If in the next 6 weeks producers could keep up and better the good work of the past 2 months we might even yet not only get back the previous level of output but make up what had been lost.

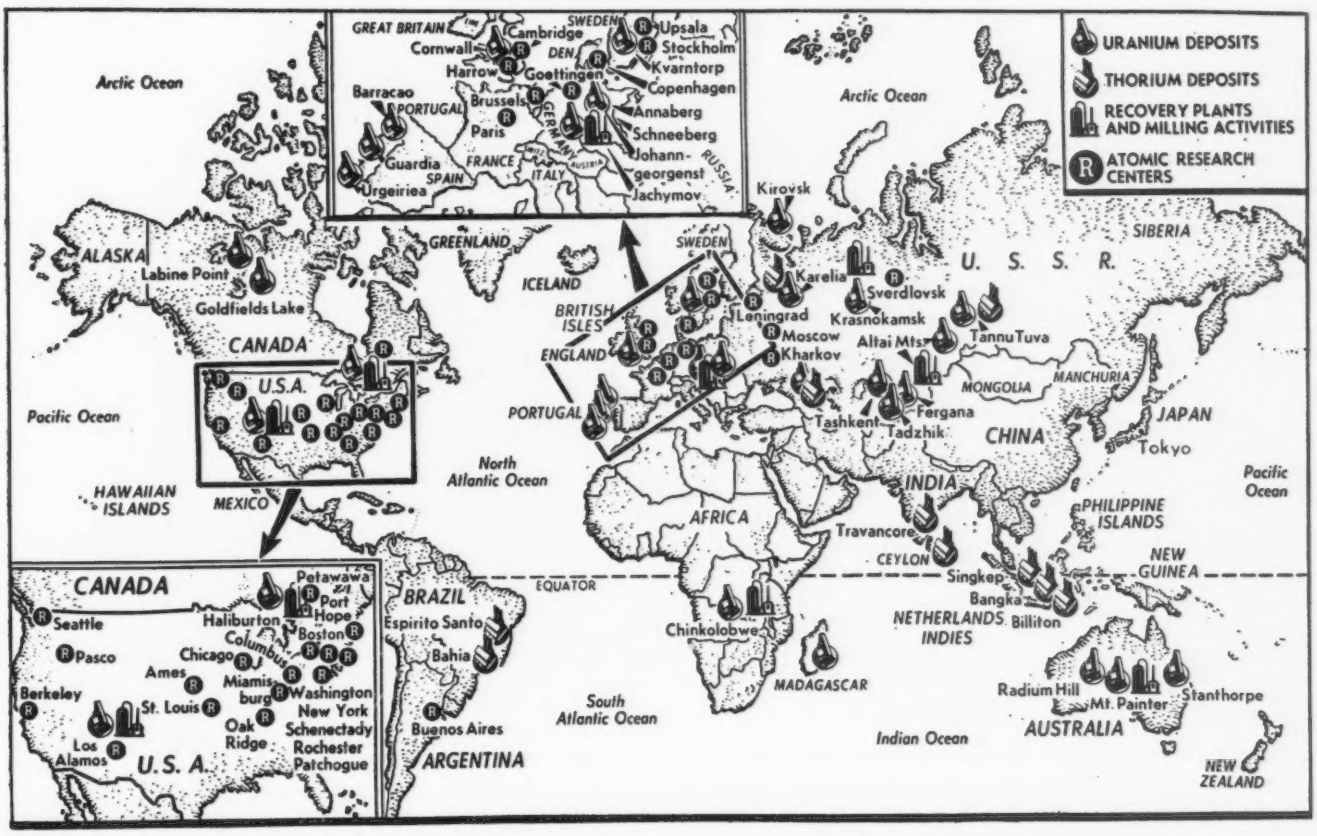
Speaking of specific lines of activity, the Lord President said that production in March of hydraulic turbines was higher than in February and the makers of steam turbo-alternators for use in power stations did especially well with deliveries more than double the average of 1946. In April Britain delivered for sale 100 civil and export aircraft, which was the highest monthly figure since the war and Mr. Morrison doubted if it was ever reached before the war. April output of locomotives was higher than in February or March and on the way back to the 1946 average. Rail car production, however, was still very disappointing.

Coal production is going fairly well but it is too early yet to assess the effects of the 5-day week. Vacations and disputes have reduced the figures for May and all that can be said at the moment is that in the only two weeks of full production the miners have produced practically as much coal in a 5-day week as they had previously done in six days. We have yet to see whether in a normal month when the full 5-day week is operating this position can be sustained, he said.

Mr. Morrison could do nothing more than hope about the fuel position. On steel, he was not very optimistic. April production was nearly up to the 1946 average, but only at the expense of running down stocks of pig iron and scrap. Mr. Morrison affirmed that the first two weeks in May were better, but of course, Whitsunday will pull down the average for the month.

Our economy, said Mr. Morrison, was being starved of steel as well as of fuel. Lack of steel is handicapping shipbuilding. In the first four months of the year British shipyards averaged only 265,000 gross tons of all types of shipping, which is at the rate of about 800,000 a year as against the target of 1,250,000 gross tons.

RACE TO JUDGMENT DAY: *The locations of the world's atomic production and research centers are located on this map from the magazine United Nations World. The inset map indicates that there are fifteen research centers in the United States alone.*



Admiral Moreell Is Elected to Board Of Hygiene Foundation

Pittsburgh

• • • **The election of Admiral Ben Moreell, USN (Ret.) to the board of trustees of Industrial Hygiene Foundation focuses attention upon the active participation of the steel industry in the foundation's program for the advancement of employee health.**

With the election of Admiral Moreell, new president and board chairman of Jones & Laughlin Steel Corp., there are now three representatives of the steel industry on the foundation's board. The other two members are:

H. G. Batcheller, president, Allegheny Ludlum Steel Corp., and R. E. Zimmerman, vice-president, U. S. Steel Corp. of Del.

Twelve steel companies are affiliated with the Foundation and supporting its research for the advancement of physical working conditions.

They are:

Allegheny Ludlum Steel Corp., Bethlehem Steel Co., Crucible Steel Co., Firth Sterling Steel Co., Inland Steel Co., Jones & Laughlin Steel Corp., National Steel Corp., National Supply Co., Republic Steel Corp., Vanadium Corp. of America, U. S. Steel Corp. of Del. and Youngstown Sheet & Tube Co.

The American Iron & Steel Institute also holds membership.

Carey Elected Chairman At Conference Meeting

New York

• • • **W. Gibson Carey, Jr., president, The Yale & Towne Mfg. Co., was elected chairman of the board, and Dr. Virgil Jordan was reelected president at the 31st annual meeting of the National Industrial Conference Board held at the Waldorf-Astoria Hotel in New York.**

A. W. Robertson, chairman of the board of directors, Westinghouse Electric Corp., and Clarence E. Hunter, vice-president, The New York Trust Co., were elected trustees of the conference board for 3-year terms.

Seven New York executives were among those reelected board members: Edward P. Farley, chairman

of the Board, American-Hawaiian Steamship Co.; R. E. Gillmor, vice-president, The Sperry Corp.; William B. Given, Jr., president, American Brake Shoe Co.; Clarence E. Hunter, vice-president, The New York Trust Co.; B. Brewster Jennings, president, Socony-Vacuum Oil Co., Inc.; George L. Morrison, president, General Baking Co.; Leon C. Stowell, president, Underwood Corp.

Rolland J. Hamilton, secretary and treasurer, American Radiator & Standard Sanitary Corp., was reelected treasurer of the conference board and Clyde L. Rogers was reelected secretary.

Reports Reopening Of Foundries in Germany

Washington

• • • **Decision has been** made by the American Military Government and German economic officials to reactivate four foundries in Hesse, according to the latest occupation report by the War Dept., in order to help relieve the shortage of metal consumer goods.

Plants scheduled for opening are two units of Burger Eisenwerke at Ehringhausen, the Vereinigte Deutsche Metallwerke at Heddernheim, and the Wilhelm Zimmer plant at Giessen.

At the same time, the American officials announced that two chief producers of antifriction bearings at Schweinfurt, the Vereinigte Kugellager Fabriken and the Kugellager Fabrik, have attained normal operation and are producing 30,000 and 1500 bearings a day. The VKF plant at Cannstatt is running at 80 pct normal rate, producing 12,000 bearings daily.

New Drill-Jig Design

Cincinnati

• • • **The manufacture** of a new precision universal drill-jig to be used on all types and makes of drill presses in order to expedite production was disclosed recently at the Porter Machine Co. of Oakley.

The company at the present time is engaged in the production of precision parts for machine tools. Now the company will be divided into two divisions, manufacturing and contract work. Production on the drill-jigs is expected to begin this month.

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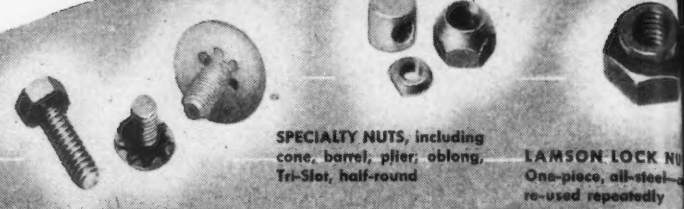

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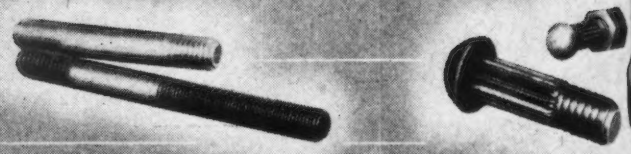

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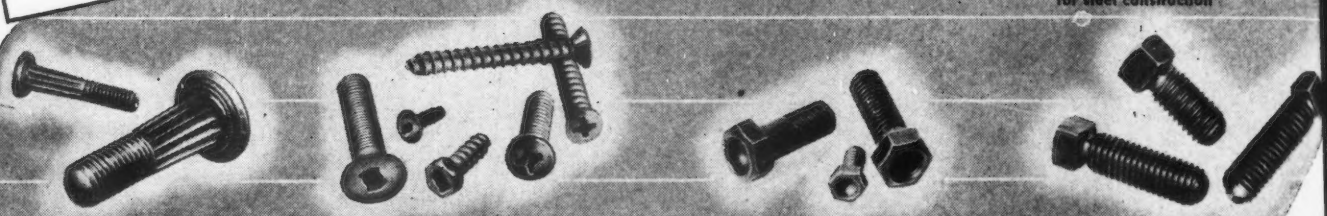

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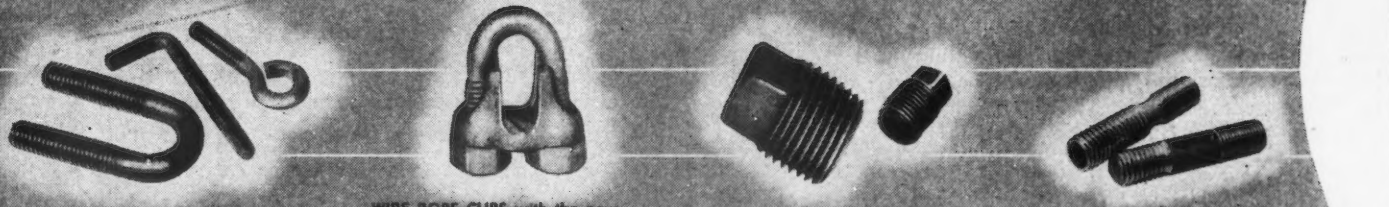

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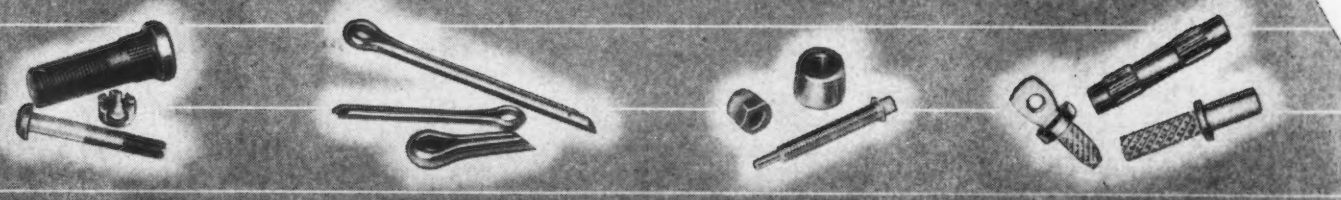

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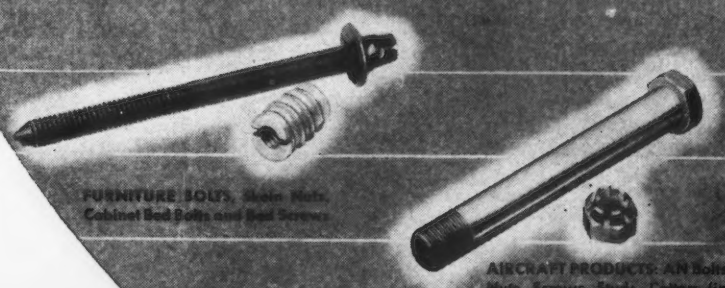

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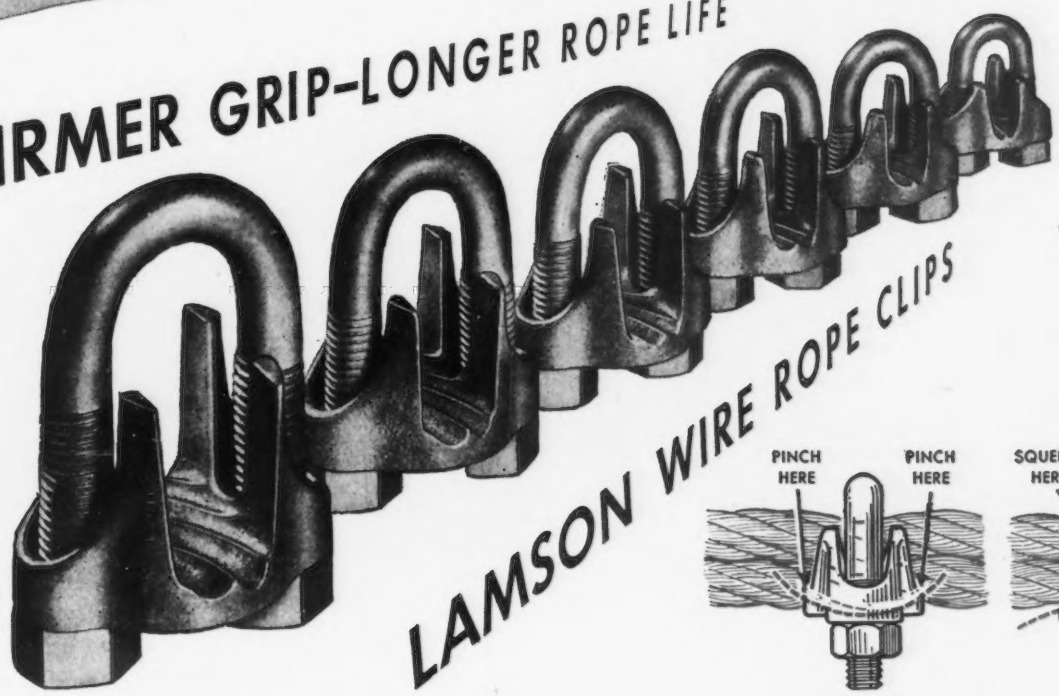

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Foundry Group Elects Moriarty President At Anniversary Meeting

Hot Springs, Va.

• • • **Wilson H. Moriarty,** vice-president, National Malleable & Steel Castings Co., Cleveland, has been elected president of the Malleable Founders Society for the coming year, succeeding Frank Shumann, president, Lehigh Foundries, Inc., Easton, Pa. Election took place at the foundry Society's 50th anniversary meeting here.

Wilson H. Moriarty

Collins Carter, president, Albion Malleable Iron Co., Albion, Mich., was elected vice-president.

The society chose George E. Bean, managing director, Wilmington, Del., works of Eastern Malleable Iron Co., as the first recipient of the Charles H. McCrea medal, an annual award established by National Malleable & Steel Castings Co. in memory of its late president. The selection was made because of Mr. Bean's work as chairman of the committee which produced the handbook, "American Malleable Iron."

The foundry industry is entering a new and highly competitive era, Mr. Shumann said in his retiring address. "We must take off our coats, roll up our sleeves and get back to fundamentals," he said. "Costs, sales promotion, public relations, mechanization, and making the foundry an ever-better place to work are some of the subjects on which we must concentrate."

The society elected as new directors for 3-year terms Mr. Carter, C. A. Gutenkunst, Jr., president, Milwaukee Malleable & Grey Iron Works, Milwaukee; J. H. Smith, general manager, central foundry division, General Motors Corp., Saginaw, and F. D. Brisse, president Laconia Malleable Iron Co., Laconia, N. H.

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New Economic Union In Europe Will Begin Operation in August

Paris

• • • **The preparatory stage** in the establishment of the Belgian-Netherlands-Luxemburg Customs and Economic Union has been completed. A tariff agreement, which is the first step has been signed by the three nations, and as a result they have been able to present a united front at the International Trade Conference being held in Geneva.

When fully completed, this union will represent a powerful economic bloc in Western Europe with a population of 18 millions; important hard coal reserves capable of producing 40 million tons of coal per year and 7.5 million tons of coke; a pig iron capacity of 7 million tons a year, and a steel industry as large.

The iron ore reserves of the new union (it is being called Benelux) will be insufficient, with the Luxemburg deposits being the sole supply, but the countries will be in a good position to purchase their ore requirements. Belgium and Luxemburg have long played an important role as steel exporting nations, while except for the export of pig iron from Ymuiden, the Netherlands has been a steel importing nation.

The new agreement specifies that neither Holland nor the Belgo-Luxemburg Customs Union shall impose customs duties on certain articles that are classified as free. In addition a uniform tariff is to be introduced 3 months after the ratification of the agreement, which is now expected to take place in August.

The difficult tasks of clarifying and standardizing the nomenclature of the two tariffs and the adoption of an ad valorem tariff in Belgium where a specific tariff had been used previously have been completed. The Dutch tariffs were principally revenue measures, where the Belgian were mostly protective. This has been settled, mostly by making increases on the levels of the Dutch measures.

The next step to be accomplished will be the introduction of uniform excise and sales taxes. The agreement on excise measures is virtually complete, but the sales and

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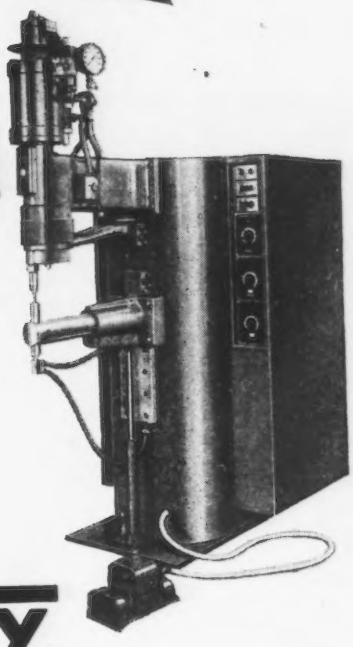

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turnover taxes will be difficult. Here again, it seems probable that the Dutch rates will be raised. The statistical systems of the three nations will require standardization as well.

The third and most difficult step will be the conclusion of a full economic and monetary union. In all three countries there is a determination to achieve this union, for it will place them among the most important trading nations.

According to the draft bills which are yet to be ratified the duties on imported steel products will be as follows: blooms 1 pct, billets 2 pct, strip 6 pct, sheet 3 to 4 pct, tinplate 4 pct, tinplate under 0.35 mm free, rails 4 pct, tubes 3 to 8 pct, machine tools an average of 10 pct, motorcars and motorcycles 24 pct.

This means an increase in the Dutch rates for iron and steel products which were previously between 0 and 1 pct and will now average between 3 and 4 pct. The difference for automobiles goes up from 15 pct to 24 pct. Primary necessities and industrial raw materials will in principle be duty free. It is expected that this increase of Dutch tax levels will not appreciably affect price levels in that country, as imports are still primarily raw materials.

An important development in connection with the union will be a certain degree of rationalization of industrial expansion in the three countries, but there are a number of conflicting interests here. The Belgians are viewing Dutch steel expansion plans with some alarm. Although both Belgium and Luxemburg are also planning certain new steel facilities as well, most circles feel that there is room for rationalization.

With a larger home market for the three countries the way will be open for a more efficient division of work and the lowering of costs of production. The increased use of high grade Swedish ores in Belgium and technical improvements have resulted in a 50 pct production increase with only 20 pct increase in labor. For a monthly production of 220,000 tons of steel only 160,000 tons of coke are being used, in place of 225,000 tons before the war.

With increased demands for iron ores following the inclusion of Holland in the union, Benelux may be

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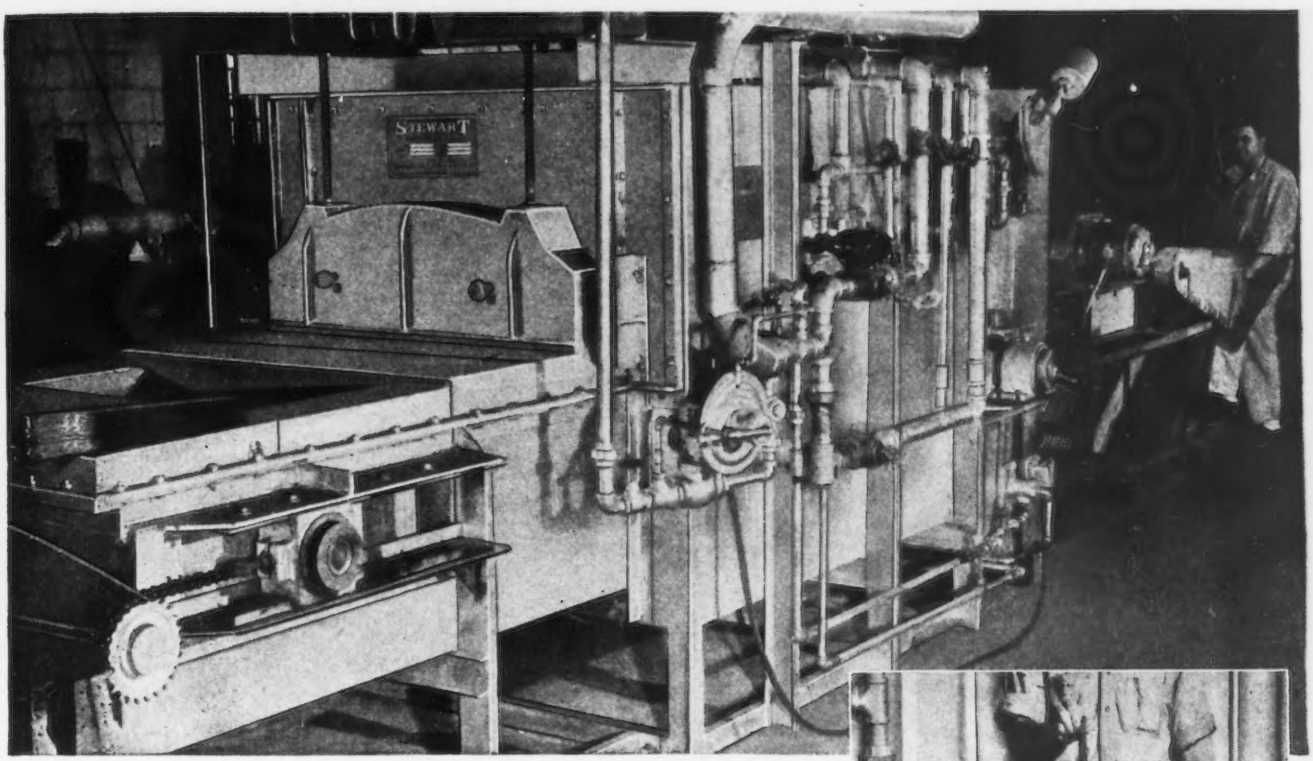
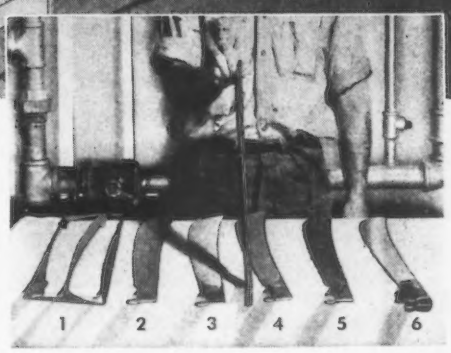


Over-all view of the gas-fired Sunbeam Stewart Conveyor Hearth Hardening Furnace in use at Briddell, Inc. for heat treating jungle knives. This installation was arranged to handle a capacity of 450 lbs. of stampings per hour.

Briddell engineers recognized two "musts" in the heat treating of their jungle knives. The treatment must prevent distortion of the stamping and, at the same time, obtain a hardness and toughness to withstand hard usage. Because of these high physicals—and the general shape of a machete—Briddell anticipated trouble. To meet these exacting requirements, Sunbeam Stewart designed a furnace and conveyor set-up. So successful has the recently installed gas-fired Sunbeam Stewart Conveyor Hearth Hardening Furnace been, that mass production of these jungle knives has become a normal operation.

This installation is equipped with an alloy conveyor belt. Blades are conveyed flatwise and are automatically discharged through a flap-type door into the quench tank. This set-up reduces to a minimum the time needed in transferring the knives from the hardening furnace to the quench. 450 lbs. of stampings an hour are handled in the Sunbeam Stewart unit. The working chamber of the furnace is 10" high x 36" wide x 5' 6" long.

This unit is typical of the industrial furnaces Sunbeam Stewart engineers are building every day to meet the specified requirements of manufacturers all over the continent. In addition, Sunbeam Stewart builds a full line of standard furnaces.



The small amount of distortion allowable in the manufacture of jungle knives—or machetes—is shown above. Typical dimensions of a machete are 28½" long, 2½" at its widest, and less than ⅛" thick. Briddell's combination Sunbeam Stewart Furnace and conveyor unit and quench has successfully overcome what was anticipated to be a bottleneck in their production.

Illustration shows: 1, Blanked out strip from which two machetes have been stamped; 2, The stamping; 3, First stage of cutting edge ground before heat treating; 4, Second strip, ground grinding, and trimmed before heat treating; 5, After heat treating; 6, Finished machete.

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able to make more advantageous import arrangements for ores in return for manufactured goods. This may intensify the growing trend toward the use of Swedish ore which is already noticeable in Belgium and Luxemburg.

Before the war 6.5 million tons of French ores found their way into Belgo-Luxemburg mills, compared with only about 300,000 tons of Swedish ore. Imports of Swedish ore at present are at the rate of 1.2 million tons per year, although the steel production rate is only about 80 pct of the 1936-38 average. This change is attributable to two factors, first the necessity for conserving coke supplies in the blast furnaces, and also to the change in the Swedish-French ore price relationship, with French ore much higher by comparison with the Swedish ore. The latter is selling at the prewar price.

The new union will have some repercussions in France as far as the steel industry is concerned. The French export of pig iron will have to meet the strong Netherlands competition which will be duty free in the Belgian market. Export of steel products to the Netherlands will face a higher duty than previously.

Dow Co. Enters Into Agreement With WAA

Washington

• • • **WAA has entered** into an interim leasing agreement with the Dow Chemical Co., which allows the company to use production equipment, owned by the government but located in Dow's Midland, Mich., plant.

Consisting for the most part of large extrusion presses, the equipment has decreased in production value because of the war-time technological changes in the processing of magnesium. The lessee plans to use the equipment, which has a reported cost to the government of $1,644,035, in experimental processes.

Information presented to the WAA indicates that certain newly developed aircraft production methods will call for the use of 80 pct magnesium in the fabrication. Pending the success of these proposed experiments, many new civilian and military uses for magnesium are contemplated.

Line Supervision Best Of Employer-Employee Information Channels

New York

• • • **Many executives** consider line supervision to be the strongest link in the communication chain, according to a survey of communication within the management group, which has just been completed by the National Industrial Conference Board. While not minimizing the value of employee newspapers, magazines, handbooks, mass meetings, and other media, executives in many of the 168 companies included in the survey believe that the foreman should be able to represent the company to his men, to answer questions, and to explain policies; and, at the same time, to interpret to his superiors the thinking of the man in the ranks.

Attitudes on the subject of keeping line employees informed vary widely, the study points out. One point of view emphasizes "an active approach" to the task. In this vein, it is "the role of the superior to provide his subordinates not only with essential information but also with a background that will help them function intelligently." This is done by taking time to explain things in detail to the supervisor, by passing on helpful written matter, by checking to see that understanding has been achieved.

While most management people expect the lower echelons to keep them informed, some of the cooperators in the survey express the belief that it is just as necessary to work constantly to get information flowing up as it is to get it flowing in the other direction. They say that "unless a superior makes special effort he will not hear all that he should from his subordinates."

Of the 168 companies providing information for the study, 125 reported that they hold regularly scheduled meetings for a major portion of their management-supervisory organization. Of the remaining 43, all but 16 reported fairly frequent meetings. The comments of many executives and the trend toward the establishment of regular programs "indicate that this method is attracting the attention of an important segment of business firms."

Among the 168 companies co-

operating in this study, 69 reported having a manual as an aid to supervisors in the administration of their responsibilities. An increase in this number is indicated since several companies reported that they had manuals in preparation.

A number of companies find it desirable to have the management-supervisory organization participate in the development of personnel policy. They feel that the development of policy is not only a task of original formulation but also one of continuous review, revision, and clarification.

Reports First Quarter 1947 Injury-Frequency Rate Lowest Since '43

Washington

• • • **The injury-frequency** rate for manufacturing industries was lower during the first quarter of 1947 than in any other 3-month period since the beginning of 1943, according to a report of the Bureau of Labor Statistics. For manufacturing as a whole there were on the average 16 disabling injuries for every million employee-hours worked during the first quarter of 1947. This compares favorably with the average of 16.2 for the last quarter of 1946 and represents a substantial decrease from the average of 18.2 for the first quarter of 1946.

In iron and steel, the injury-frequency rate for every million employee hours worked ranged from a low of 8 in the basic iron and steel industry to a high of 43.6 in iron foundries. In nonferrous metals, the low was 17.3 for nonferrous basic shapes and forms, while the high was 30.2 in aluminum and magnesium products. The low in the machinery group was 11.5 in the commercial household and machinery industry, while the high was 26.7 in food products machinery.

While the injury-frequency rate dropped during the first quarter of this year, the total number of disabling work injuries experienced by employees of manufacturing plants was somewhat greater than in the last quarter of 1946 because of increased employment.

Estimates based upon the available reports indicate that approxi-

mately 127,000 employees of manufacturing plants were disabled by work injuries in the first quarter of 1947. This represents 2900 more injuries than occurred during the preceding quarter and 19,500 more than occurred in the first three months of 1946.

From the information available at the end of March it is estimated that about 400 of the workers who were injured during the first quarter have died as a result of their injuries and that about 5300 others will have some form of physical impairment for the remainder of their lives.

Industrial Injury Frequency Rates in Manufacturing, First Quarter 1947[1]

	First Quarter 1947	1946 Annual
Iron and Steel:		
Bolts, nuts, washers, and rivets	19.5	18.2
Cold finished steel	22.2	24.1
Cutlery and edge tools	23.8	19.2
Fabricated structural steel	27.2	28.7
Forgings, iron and steel	28.1	27.3
Foundries, iron	43.6	45.5
Foundries, steel	30.3	35.6
Hardware	19.8	16.9
Heating equipment, n.e.c.	28.1	28.6
Iron and steel (basic)	8.0	8.8
Metal coating, engraving	23.6	25.4
Ornamental metal work	36.3	29.1
Plate and boiler shop products	29.7	36.6
Plumbers' supplies	23.4	20.3
Screw machine products	21.3	20.1
Sheet metal work	23.2	28.1
Stamped and pressed metal prod., n.e.c.	23.7	23.0
Steam fittings and apparatus	18.3	22.2
Barrels, kegs, drums and packages	14.4	17.5
Steel springs	29.0	24.3
Tin cans and other tinware	17.7	18.9
Tools except edge tools	25.2	24.7
Wire and wire products	19.5	22.8
Not elsewhere classified	18.4	24.6
Machinery, Except Electric:		
Agricultral machinery and tractors	19.4	21.9
Bearings, ball and roller	20.1	18.6
Commercial and household machinery	11.5	12.8
Construction and mining machinery	25.0	24.8
Elevators, escalators and conveyors	20.1	27.3
Engines and turbines	16.1	17.0
Food products machinery	26.7	26.0
General Industrial Machinery, n.e.c.	21.6	22.8
Machine shops (jobbing and repair)	22.8	24.5
Measuring and controlling equipment	17.8	13.8
Power, transmission equipment except ball and roller bearings	17.4	22.4
Metalworking machinery	15.1	15.5
Pumps and compressors	19.8	25.9
Special industry machinery, n.e.c.	22.6	25.4
Textile machinery	13.2	16.2
Nonferrous Metals:		
Aluminum and magnesium products	30.2	26.3
Foundries, nonferrous	22.6	27.2
Nonferrous basic shapes and forms	17.3	16.1
Transportation Equipment:		
Aircraft	4.5	5.1
Aircraft parts	9.2	10.5
Motor vehicles	12.5	12.3
Motor-vehicle parts	25.2	24.0
Railroad equipment	19.0	20.7
Shipbuilding	23.9	23.6

[1] Average number of disabling work injuries per million employee-hours worked.

Fifty-Ton Bessemer Converters Finding Favor With British

Washington

• • • **Fifty-ton converters** built in Germany during the war may be the most economical way to produce large quantities of high-quality basic bessemer steel according to a British report recently made available through the Dept. of Commerce. In another metallurgical report, British investigators state that sheets for electrical transformers with a guaranteed energy loss of 0.9 watts per kilogram were produced by only one German firm.

Declining supplies of high-grade iron ores in Europe may increase the importance of the bessemer process, the British investigators point out. While 25 to 28 tons capacity has long been standard for German installations, recently built 50-ton furnaces have given good results. By using a shallow converter bath, German experts said they could appreciably reduce the nitrogen content of the steel. The quality of this basic bessemer steel was high enough so that it could often be substituted for open hearth steel during the war.

Alloy steel has been made in Germany at low cost by melting a rich alloy charge in a 50-60 ton electric arc furnace, casting this charge in a ladle and pouring into it open-hearth or basic bessemer steel. The steel thus made was said to be of uniform quality and low inclusion count, the investigators report.

In the production of light alloys melting, holding and casting processes were considered noteworthy by the investigators. Outstanding features were also seen in the heavy forging and extrusion presses.

The best German sheet steel for electrical transformers, was produced by the firm of Capito and Klein from steel ingots supplied by Krupp. The steel had a guaranteed

energy loss of 0.9 watts per kilogram at 10,000 gauss and a frequency of 50 cycles per second. This steel contained from 4.2 to 4.5 pct silicon, 0.15 pct manganese, very small amounts of sulphur, nickel, phosphorous and chromium, and no aluminum. The maximum carbon content was 0.1 pct; 0.06 to 0.08 pct was considered best.

In contrast to British practice, German electrical steel was entirely refined in basic electric arc furnaces. Krupp used a duplex open hearth-electric furnace system, while Eisen-und-Huttenwerke used a prolonged straight electric process, starting with 90 pct selected scrap and 10 pct low phosphorous pig iron to produce electrical steel with a loss of about 1.1 watts per kilogram. Thyssen, the major producer, employed both a duplex bessemer-electric process and a straight electric process for the production of its highest grade of electrical steel which had a loss of 1.0 watts per kilogram.

The report on metallurgy plants is entitled *Iron, Steel and nonferrous metal works plant and machinery.* (PB-60387, photostat, $9; microfilm, $3; 121 pages, including tables).

The report on electrical steels is called *Manufacture of electrical steel sheets in Germany.* (PB-65673, photostat, $7; microfilm, $3; 105 pages, including tables, graphs and drawings).

Orders for these reports should be addressed to the Office of Technical Services, Dept. of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

OHE Okays Constructions

Washington

• • • **Construction approval** has been granted by the OHE to the Magnavox Co., Paducah, Ky., for a $368,000 building for the production of solenoid devices for the washing machine and automobile industries; loudspeakers and transformers for the radio industry will also be produced.

Other applications which have been approved included a $60,000 screw machine products factory to be built for Redmer Sons Co., of Franklin Park, Ill.; Sheet Metal Products Co., Cleveland, a metal products factory at a cost of about $56,500.

Awarded Stevens Medal For Achievement In Powder Metallurgy

Hoboken, N. J.

• • • **The manner in which** the intricate presses now used for manufacturing powdered metal products have been developed during the past 30 years from the relatively simple machinery used to form mint candies, pills, blueing tablets and moth balls was described by Lawrence H. Bailey of the F. J. Stokes Machine Co. at the third annual medal lecture sponsored by the Powder Metallurgy Laboratory of Stevens Institute of Technology, delivered recently.

Mr. Bailey was awarded the medal presented annually by the president and trustees of Stevens in recognition of his outstanding achievement in the field of powder metallurgy. The use of powdered metals has become an important factor in many industrial processes in recent years.

"The present demand is for still larger presses with more punches and more complicated motions, so that more complicated pieces can be made," said Mr. Bailey. He described one of the latest and most complex presses, a single-station cam press known as the "244" which was first used for making armatures for military field telephones. It applies 85 tons total pressure from above and below, has two independent upper punches and three lower punches and transfers loose and partly compressed powder from the original filling levels to higher and lower compressing levels.

Basic problems to be met in building presses to handle powdered metals are the securing of proper density and density distribution and the required accuracy in the parts produced, Mr. Bailey explained. It is also necessary to provide proper die fill and sufficient pressures to attain these objectives. The presses must be rugged, accurate and flexible enough to handle a variety of work.

During the first World War cored pieces were made for several of the shell loading companies and were used in the boosters and time-trains in the noses of shells, he said.

"Twenty-seven years ago when

(CONTINUED ON PAGE 143)

Information Free

(1) Crucible Furnaces:

Uses, construction and operation of multiple unit crucible furnaces for temperatures to 1850°F and two types for temperatures to 2000°F, are given in bulletin HD 1246. Specifications and illustrations of each type are given. *Hevi Duty Electric Co.*

(2) Diecasting Machine:

General information and specifications on the Wickers No. 4 high-speed automatic diecasting machine for lead, tin and zinc alloys, are contained in bulletin W-400. Features such as die opening adjustment and clamping mechanism are illustrated. *Wickes Bros.*

(3) Centralized Lubrication:

This folder reviews a number of typical installations of centralized systems of lubrication for industrial equipment in manufacturing plants, explaining advantages such as reduced maintenance and greater machine life. Six case histories are included. *Farval Corp.*

(4) Press Aligners:

How dies may be protected and presses operated more efficiently is explained in folder on ball action aligners known as Di-All-Ners, for punch presses. Directions for installation are given with diagrams. *Lempco Products, Inc.*

(5) Carbide Form Tools:

Facilities for the production of carbide form tools as well as typical tools produced, are included in form No. CT 1. End mills, counterbores, cams and ground form tools are available. *Weldon Tool Co.*

(6) Corrosion Protection:

Protective qualities of No-Rust Removable coating for iron and steel products are listed with applications given in folder. Coating is applied over parts in shipment or storage by spray, brush or dipping and is removed with gasoline or kerosene. It is said not to harm painted, varnished or lacquered surfaces. *Frost Paint & Oil Corp.*

(7) Power Press Safety Guard:

Features of an electronic controlled automatic safety guard designed especially for power presses, are presented in folder. Operating principle is explained with a diagram of an installation and of the electronic control circuit. *Hoffman Engineering Corp.*

(8) Fence Machine:

Information on machines designed to produce field type fencing of the hinge-joint type is presented in booklet No. 313. Drives and feed mechanism are discussed as well as the styles of fence produced on various machines. Wire mill equipment is also described and illustrated. *Woan Equipment Corp.*

(9) Gas Carburizing:

How modern gas carburizing is accomplished is told in bulletin SC-134, with related processes explained. Applicable prepared atmospheres, their composition, use and method of preparation are discussed. Engineering information is included in chart, graph and table form. *Surface Combustion Corp.*

(10) Diecasting Machine:

Features of two Cast-Master diecasting machines for aluminum, magnesium or brass are fully outlined in folder with several illustrations showing a complete unit with important parts identified. Attachments for processing zinc, tin and lead are shown. *Miller-Taylor Tool Co.*

(11) Rotary Dumpers:

Book No. 2048-A covers a line of rotary dumpers for mine and railroad cars. Illustrations and drawings are used to explain features of the types included. A complete installation said to dump up to 30 railroad cars per hour is shown. *Link Belt Co.*

(12) Gas Equipment:

Industrial gas furnaces, torches, burners, heat baths and other related equipment are included in catalog No. 46 with specifications and illustrations of various models and types. Equipment is designed to operate on atmospheric or city gas pressures and it is stated blowers, motors and auxiliary equipment are not required. *Charles A. Hones, Inc.*

(13) Bench Lathes:

Catalog M-101 covers Ames lathes in detail and also features a number of accessories. Specifications are listed for the No. 3 open-head bench lathe and the No. EH3 enclosed head bench lathe. *Ames Precision Machine Works.*

(14) Grinding Abrasives:

The way to faster, cooler grinding with Sterfast grinding wheels and segments, is presented in a folder. Faster stock removal without burning is among the advantages listed. *Sterling Grinding Wheel Div.*

(15) Metal Packing:

The most frequently used industrial applications for metal packings are outlined in folder. A drawing accompanies each installation described. Listed also are wiper rings and piston rings manufactured by the company. *France Packing Co.*

(16) Metal Cleaning:

Advantages of Deoxidine for rust removal, chemical cleaning and as a bond for painting are presented in an illustrated data sheet. Other metal cleaners and finishes; copper coatings, metal stripping compounds and fluxes are listed. *American Chemical Paint Co.*

(17) Weights and Measures:

Standards of weights and measures for volume and length are given in bulletin No. 1500 for the benefit of scientific laboratories, government departments of weights and measures and other organizations requiring information of this type. Precision equipment made by the company is illustrated. *W. & L. E. Gurley.*

(18) Cut-Off Machines:

Several models of Radiac abrasive cut-off machines for dry and wet cutting are described and illustrated in pamphlet. Rubber bonded and resinoid bonded abrasive discs are listed. *A. P. De Sanno & Son, Inc.*

(19) Cutting Oil:

A folder describes KleenKut, a laboratory controlled water-mix cutting oil, and gives typical applications and the proper method for mixing with water. *D. A. Stuart Oil Co., Ltd.*

(20) Metal Cleaning Emulsion:

Emlon for stable metal cleaning emulsions is presented in this leaflet. The product is described as especially made to meet all requirements for a solvent emulsion type cleaner. A variety of applications are listed. *Wyandotte Chemicals Corp.*

(21) Heating Equipment:

Heating equipment, valves, steam traps, gauges, thermometers and industrial instruments are included in catalog 75-C. This literature has been prepared particularly for original equipment manufacturers requiring equipment of this type. Complete information is given on each type and manufacturing methods are described. *Jas. P. Marsh Corp.*

NOTICE TO READERS: Offer limited to two months from date of issue

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5/26/47

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(22) Dust Collector:

Illustrated descriptions of construction and operation of the Uni-Wash Shake-Out dust collector are contained in booklet. This unit collects dust in the form of a wet sludge which is removed by means of an automatic conveyor. Information on an automatic damper for use with the unit is included. *Nswood-Detroit Co.*

(23) Corrosion Test Data:

Comparative test data on Monel, 70/30 copper-nickel, mild steel and other materials in refinery equipment handling caustic solutions is contained in bulletin. Reports on plant corrosion tests in equipment used to remove mercaptans from petroleum products are included. *International Nickel Co., Inc.*

(24) Magnetic Brakes:

Catalog 604-D on magnetic brakes for floor, motor and machine mounting, contains data, specifications, forms for mounting of brakes, general application information and illustrations. *Stearns Magnetic Mfg Co.*

(25) Spacer Tubes:

Nine important features of Superformed spacer tubes which are rolled and formed from customer-specified material, are listed in leaflet. Lengths up to 12 in. in gauges from 26 to 3 are available. OD sizes range from ¼ to 5¼ in. and ID from 3/16 to 5 in. Also mentioned are spring clips, brackets and odd shapes produced to specification. *National Formetal Co.*

(26) Electrodes:

A complete line of electrodes for low alloy high-tensile, mild, stainless and heat resisting, special purpose and tool steels and for abrasion resisting applications has been included in this booklet. Detailed technical data and specifications are included. *Alloy Rods Co.*

(27): Management Control:

How to get maximum production from existing plant facilities is the theme of an illustrated booklet which describes Sched-U-Graph, a chart-board application of time control principles. This device combines essential record data with graphic interpretation. *Remington Rand Inc.*

(28) Grinders:

Booklet contains information on the Ace tool and cutter grinder and a precision grinder recently developed for tungsten carbide-tipped tools. Other toolroom machines manufactured by the company are listed. *Oliver Instrument Co.*

(29) Cutting Tools:

Specifications and illustrations of a line of cutting tools has been included in catalog No. 16. Tables of recommended cutting speeds are given with information on correct application. *Severance Tool Industries, Inc.*

(30) Twist Drills:

How to sharpen twist drills is told in manual G-1. Recommended drill points for various materials and other information is explained with illustrations and drawings. *Republic Drill & Tool Co.*

(31) Melting Indicator:

An indicator for determining the melting point of various tin-lead solders gives both molten and solid temperatures in °C and °F. This device is a slide-adjustment type and contains a wire gauge comparer on the reverse side. *Federated Metals Div., American Smelting & Refining Co.*

(32) Electronic Apparatus:

Principles of operation and technical specifications of electronically controlled voltage regulators and Nobatrons has been released in catalog form. Containing information on the company's entire line of electronic apparatus, illustrations show curves and pictures of various models available. *Sorensen & Co., Inc.*

(33) Control Devices:

A line of industrial control devices and safeguards are described in catalog No. 8302, with schematic diagrams, dimensional drawings and photographs, specifications, range charts and other information. *Brown Instrument Co.*

(34) Drills and Grinders:

Metalmaster ball bearing hand drills, drill stands, hole saws, carbon and valve cleaning brushes, and grinding, polishing and buffing units are described and illustrated in catalog No. 50. Attachments and accessories are also listed. *Bradford Machine Tool Co.*

(35) Drilling Machines:

Catalog No. 66 illustrates and describes Sibley 24 and 28 in. drilling machines and accessories. Details are included on design features such as the rotary-geared coolant pump, geared tapping attachment, feed mechanism, motor drive and top frame assembly. *Sibley Machine & Foundry Corp.*

(36) Alloy Strength Data:

Physical data relative to the behavior of Alten No. 8 alloy when subjected to heat and longitudinal stress, has been compiled in bulletin No. FT-104 for users of iron castings requiring heat resistance. Related information is also included. *Alten's Foundry & Machine Works.*

(37) Bonderizing:

Bonderizing and its applications on steel, aluminum, zinc, die castings and Bonderite as an aid in deep drawing of steel and aluminum, has been reviewed in this 44-p catalog. Test results on treated and untreated metals are illustrated and typical installations are shown. *Parker Rust Proof Co.*

(38) Forgings:

Prepared for management executives, design engineers and metallurgists, folder described applications of hydraulic pressed and flat die forgings with suggestions as to use and principal advantages of each. *Jos. Dyson & Sons, Inc.*

(39) Water-Cooled Burner:

An artillery type water-cooled burner with atomized fuel injection for open-hearth furnace operation and which can be used with any liquid or gas fuel, is described in folder. Burners are equipped with adjustable atomizers. Installations are shown. *The Crowe Engineering Co.*

(40) Abrasives:

A wide variety of abrasives including India stones and files, and coated abrasive products, has been listed for the industrial supply trade in loose-leaf form. Necessary ordering information is included. *Behr-Manning Div. of Norton Co.*

(41) Cooling Equipment:

Publication CE 47 includes detailed data on the most recent developments in the cooling equipment industry, with information on cooling towers, fin units, spray ponds and nozzles. This catalog is divided into sections to facilitate reference. *Santa Fe Tank & Tower Co.*

(42) Hydraulic Machine Tools:

The line of Hy-Draulic machine tools, including planers, shapers, slotters, shaper-planers and special installations, is presented in catalog form. Complete information on engineering and construction has been included with specification data for each type. *Rockford Machine Tool Co.*

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(CONTINUED FROM PAGE 140)

the first powder metallurgy job came along, the available machines and dies were comparatively simple, and pieces pressed from powdered metals were therefore limited in size and complexity," said Mr. Bailey. "The metal powder was handled after lubrication in the same manner as other powders."

In 1920 the first press for metal powders which the Stokes company sold was bought for use in manufacturing automotive starting motor brushes. A copper and lead mixture was used, and in the first test ½ in. diam tablets were made on small hand operated automatic tablet machines. Mr. Bailey stated that the tablets were sintered in a Bunsen flame and the quality was tested with an ordinary pocket knife. The next step, he said, was to make these same pieces faster, and a rotary machine was developed for this.

As the possibilities of powder metallurgy in manufacturing began to be recognized, Mr. Bailey said that there was a demand for machines to make larger and more complicated pieces, and many new problems were presented.

Outlining the progress in machine design, Mr. Bailey said that in 1925 an entirely new type of press was developed to manufacture the now familiar "oil-less bearing." The final result was the "S2" press now so widely used in the porous bearing industry.

A later development, which he described, is a press whose method of operation can readily be changed from simultaneous to nonsimultaneous application of pressure from above and below.

For higher production speed on small parts an improved machine was then designed, Mr. Bailey explained. It is used for both straight and flanged bushings and is widely used in the radio industry for making iron cores with or without brass adjusting screws.

Larger cam presses and 30 to 100 ton rotary presses have now been developed, Mr. Bailey said. Recently fully automatic hydraulic presses have been built giving pressures up to 300 tons and speeds of 6 pieces per min with single dies and correspondingly greater production with multiple dies. These presses have their own hydraulic pumps and pressure systems.

Survey Reveals Rapid Increase in Radiant Heating Installations

Pittsburgh

• • • **Ten years ago** radiant heating in the United States was a method of space heating mentioned briefly in scientific books. There were only four recorded installations in the country. No practical information on the subject was available. Today, there are upwards of 10,000 installations and nearly a thousand new ones are being made each month, according to A. M. Byers Co., Pittsburgh, pioneers of radiant heating.

The approximate number of radiant heating systems now in use throughout the country is based on a nationwide field survey made by Byers representatives among architects, pipe suppliers, heating contractors and engineers and an analysis of the sales records of wrought iron radiant heating pipe.

As important as the rapid increase in the number of installations is the fact that radiant heating has been used in virtually every type of structure, both private and government-owned, in every part of the country. These include homes in all price ranges, and commercial, industrial, institutional buildings.

A survey of 1000 typical installations located in 45 states shows Ohio has 16 pct of the projects surveyed; Pennsylvania, 11 pct; Illinois, 6 pct, and New York and Massachusetts, 5 pct each. Every southern state is represented among these projects, Virginia leading with nearly 5 pct of the national total.

The 1000 radiant heating installations fall into these classifications: Residential, 47 pct; commercial, 28 pct; industrial, 16 pct; institutional, 8 pct, and miscellaneous, 1 pct.

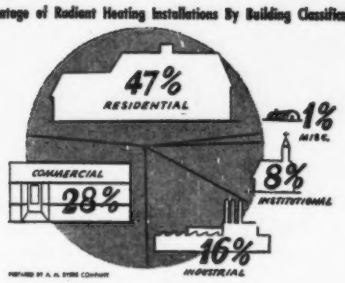
The analysis shows that 93 pct of the installations surveyed use floor-type radiant heating coils. There were no projects in which wall coils exclusively carried the heating load but a few installa-

tions had wall panels as supplementary heating elements.

More than 90 pct of the installations surveyed have the radiant heating coils in concrete floors, and more than 95 pct of the radiant heating pipe coils in the installations surveyed were welded. Improvements made in welding techniques and an increase in the number of qualified welders have led to the almost exclusive adoption of welded coils.

Seventy-three percent of radiant heated buildings included in the survey are 1-floor plans, 25 pct are 2-story structures, over 1 pct

Percentage of Radiant Heating Installations By Building Classification



3-story buildings, and less than 1 pct for those above three stories.

One reason the percentage of radiant heating systems installed in one-floor structures is high is the fact that government restrictions limited the number of multi-story buildings that were erected during the war.

The floor-heating method has eliminated many of the problems inherent to basementless construction, such as dampness and cold drafts. Therefore it was accepted more rapidly for such structures as garages, aircraft hangars, factories and 1-story houses which have floor slabs built on grade. That the system is just as practical for multi-story buildings has been proved by installations in buildings up to eight stories high.

Many of the radiant heating systems studied utilize both sinuous coils and grids. The available data (incomplete for many structures) reveal that 55 pct of the installations contain sinuous coils and 45 pct grid coils. Common practice, the survey indicated, seems to be to specify grid patterns for large areas and sinuous coils for small rooms. Factories and garages, for example, frequently have grid designs in the shop areas and sinuous coils in offices, rest rooms, etc.

New Directors Elected At Annual Meeting Of Bituminous Coal Group

Columbus, Ohio

• • • **Coal technology and the** bituminous coal industry's intensive program to take full advantage of science received major attention during two meetings of Bituminous Coal Research, Inc., held here recently.

Howard N. Eavenson, Pittsburgh, president of BCR, presided during the annual meeting. Nearly 150 coal company executives and engineers attended, electing two new directors—George Dunglinson, Jr., Roanoke, Va., vice-president in charge of traffic, Norfolk & Western Railway, and P. B. C. Smith, Memphis, Tenn., president, Southern Coal Co., Inc.—and reelecting five other members of the board of directors. Those reelected were Mr. Eavenson; B. R. Gebhart, Chicago, vice-president in charge of sales, Chicago, Wilmington & Franklin Coal Co.; J. B. Morrow, Pittsburgh, president, Pittsburgh Coal Co. of Pennsylvania; M. L. Patton, Cincinnati, vice-president, Truax-Traer Coal Co.; and R. D. Stockdale, Columbus, president, Red Jacket Coal Sales Co. All seven directors will serve in 1947-48, having been named for a 2-year period.

At a board meeting, following the annual meeting, all officers of the BCR agency were reelected. They are Mr. Eavenson, president. R. H. Sherwood, Indianapolis, president, Central Indiana Coal Co., Mr. Morrow, and Harold J. Rose, Pittsburgh, director of research, vice-presidents; M. L. Garvey, Washington, D. C., treasurer; C. A. Reed, secretary, and J. F. Hanley, assistant secretary and treasurer, both of Washington, D. C.

Directors now serving 2-year terms in the 1946-47 period are Edwin H. Davis, Columbus, president, New York Coal Co.; H. A. Glover, Huntington, W. Va., vice-president in charge of sales, Island Creek Coal Sales Co.; Ralph E. Jamison, Greensburg, Pa., president, Jamison Coal & Coke Co.; S. S. Nicholls, New York, vice-president, C. H. Sprague & Son Co.; D. H. Pape, Monarch, Wyo., president, Sheridan-Wyoming Coal Co., Inc.; Dr. C. J. Potter, Indiana, Pa., assistant to president, Rochester & Pitts-

(CONTINUED ON PAGE 149)

This town became world famous..

Greenfield, Massachusetts, is just as beautiful today with its elm-shaded streets and colonial homes as it was 75 years ago. But during those years it has become world famous as the home of fine threading tools. These GTD "Greenfield" tools are used in every part of the world where metal working is done. They have played a key role in the Machine Age that has freed mankind from drudgery. The modern American threading tool industry was born in Greenfield in 1872 with an idea for a better die. The chief industry of this little town in Pioneer Valley has never ceased pioneering in its field to this day. Wherever threading tools are used, the name GTD "Greenfield" stands for quality.

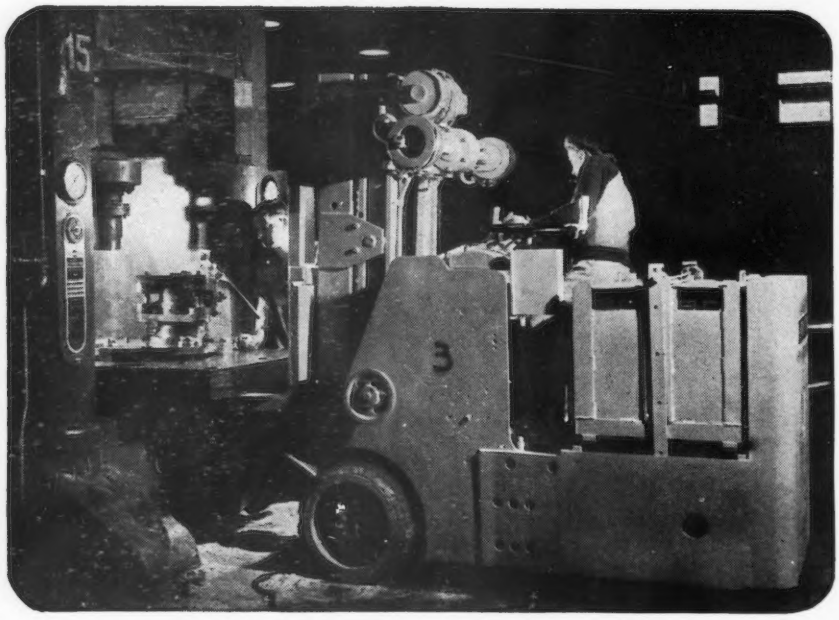
GTD Greenfield 75th YEAR

A major pioneering feat in internal threading was the development by GTD "Greenfield" of the "Gun" Tap. It is made with fewer flutes and a spiral point which causes the tap to cut a curling chip that is "shot" ahead. The design produced a stronger tap and eliminated the tendency of chips to clog the flutes, a principal cause of tap breakage, and stepped up production standards.

GREENFIELD TAP and DIE CORPORATION
Greenfield · Massachusetts

The GEOMETRIC TOOL COMPANY
New Haven, Connecticut · In Its Fifty-Fourth Year
A DIVISION OF GREENFIELD TAP and DIE CORPORATION

Handling Work is **STOP** *and* GO

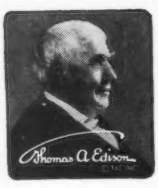


and Needs Instant-On-Off Power

In replacing a loaded skid box with an empty beside a machine, an industrial truck will make an average of approximately 14 moves forward, backward, up and down. A battery industrial truck has a natural advantage in this kind of stop-and-go service because it gets the necessary surges of power instantly from its battery, yet consumes no power during the stops. Thus it is not only economical of power, but the electricity used for charging its batteries is low-cost power.

Its electric-motor drive operates quietly, without vibration, and thus with well-nigh negligible repair requirements. With batteries exchanged two or three times per 24 hour day, it is continuously supplied with power and, since one battery is charged while the other works, the truck need not stop work for servicing of its power unit.

For 24 hour-a-day material-handling work, therefore, a battery industrial truck is an inherently dependable and economical machine, especially when powered by EDISON Nickel-Iron-Alkaline batteries. With steel cell construction, a solution that is a natural preservative of steel, and a foolproof electrochemical principle of operation, they are the longest-lived, most durable, and most trouble-free batteries. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey.* In Canada: *International Equipment Company Limited, Montreal and Toronto.*



EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

In Industrial Trucks, EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages.

1. They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel. 2. They can be **charged rapidly;** gassing cannot dislodge the active materials. 3. They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place. 4. They are **simple and easy to maintain.** 5. They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling. 6. They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

(CONTINUED FROM PAGE 146)

burgh Coal Co.; Mr. Sherwood; and R. L. Stearns, Jr., Stearns, Ky., vice-president, Stearns Coal & Lumber Co., Inc.

Julian E. Tobey, New York, managing director, Fairmont Coal Bureau, was reelected chairman of the technical advisory board of BCR. E. C. Payne, Pittsburgh, consulting engineer, Pittsburgh Consolidation Coal Co., was named to head the motive power committee. John Mitchell, Boston, director of research, Eastern Gas & Fuel Associates, was elected chairman of the gasification and carbonization committee.

Incumbent chairmen were reelected as follows: V. G. Leach, Chicago, chief combustion engineer, Peabody Coal Co., industrial utilization committee; Fred K. Prosser, Roanoke, Va., coal traffic manager, Norfolk & Western Railway, residential stokers: C. F. Hardy, Cincinnati, chief engineer, Appalachian Coals, Inc., hand-fired heating equipment; and H. F. Hebley, Pittsburgh, director of research, Pittsburgh Coal Co. of Pennsylvania, mining and preparation committee.

Weekly Gallup Polls

(CONTINUED FROM PAGE 103)

cording to occupational groups. The farmers of the country, many of whom are employers of farm labor, are least in favor of raising the minimum wage, with manual workers the most in favor.

	Approve Pct	Disapprove Pct	No opin. Pct
Manual workers	85	12	3
White collar	71	25	4
Prof. & Bus.	60	35	5
Farmers	50	40	10

Sentiment for increasing the minimum has been found in many previous surveys by the institute. Last October, just before the Congressional election, the nation's voters were polled on the question in this way:

"Should the Congress elected in November pass a law raising minimum wages throughout the country from 40c to 65c an hr.—that is, no worker could receive less than 65c an hr.?"

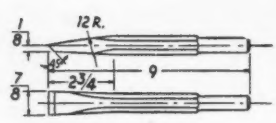
The vote was 66 pct in favor, 26 pct opposed, and 8 pct no opinion.

47 SIZES AND STYLES OF CLECO CHIPPERS

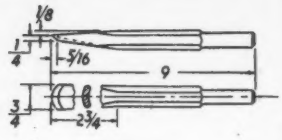
No. 3 WA Chipper with ratchet lock handle.

FLAT OR COLD CHISEL
Additional Lengths 12, 18, 24

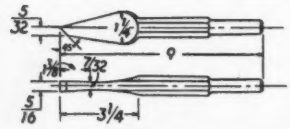
JUST A *FEW* OF THE MANY HELPFUL CHISEL DRAWINGS IN BULLETIN 75B



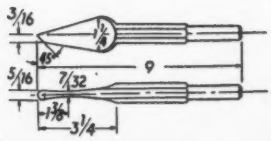
SIDE CUTTING CHISEL
Additional Lengths 12, 18, 24



GOUGE
Additional Lengths 12, 18, 24



CAPE CHISEL
Additional Lengths 12, 18, 24



ROUND NOSE CHISEL
Additional Lengths 12, 18, 24

Send for Bulletin 75B, FULLY DESCRIBING THE MANY TYPES OF CLECO CHIPPERS

• In this large, varied line you will find the *exact* tool for *every* chipping, calking, beading, and scaling requirement. Either the open or closed style of handle may be had, and, for the open type, you have a choice of either a bolt or a ratchet locking device. There is also a choice of two valve mechanisms, both efficient and practically breakage-proof.

Cleco Chippers use a throttle valve that graduates the air supply, thus giving a smooth start to the piston, minimizing recoil and making the hammer easy to hold and control on the work. Furthermore, Cleco Chippers "stand the gaff" because they are extra-tough. Plungers and chisel bushings are made of hardened and tempered tool steel, ground to close limits. The cylinders are made of selected alloy steels, carefully heat treated to insure super strength.

Cleco PNEUMATIC TOOL DIVISION
of THE REED ROLLER BIT COMPANY
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